THE EXTENSION BULLETIN

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A number of requests concerning the work of the Extension Department have recently been received.

In order that the public may have this knowledge, the report of the Department for the last fiscal year is given in this issue of The Extension Bulletin. This report includes a copy of the Smith-Lever Bill recently passed by Congress, concerning which frequent inquiries are being made. (See Page 15).

Special attention is directed to the fact that the Smith-Lever Bill, appropriating funds to the College for agriculture and home economics extension, must be accepted by the Legislature before the State can secure the Federal appropriation provided by the bill. In accordance with the terms of the latter, the Governor of this Commonwealth has accepted the Act pending the meeting of the Legislature, and the initial appropriation of $10,000 is being used by the College during the present fiscal year.

Special note should also be made of the fact that every dollar appropriated by the National Government must be matched by a dollar from within the state.

REPORT OF THE DEPARTMENT OF AGRICULTURAL EXTENSION FOR THE YEAR ENDING JUNE 30, 1914.

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State College, Pennsylvania.

Dear Sir:—

I hand you herewith a report of the activities of the Department of Agricultural Extension for the year ending June 30, 1914.

During the period which this report covers, the character of the work has been more diversified and service has been rendered to a much larger number of people than ever before. Owing to lack of funds it has not been possible to meet all of the requests for assistance which have come to the Department. Much of the work here outlined has necessarily been performed by members of other departments of the School. This practice will be continued, since specialists in the various lines of investigational work are best equipped to render service in their particular fields. In this connection I desire to express my sincere appreciation of the courteous consideration and the spirit of co-operation which has at all times characterized all the departments of the school in their contact with the Extension work.

Phases of the Work.

The following is a list of projects which has been under way for the last two years. Owing to insufficient funds, some parts of the work have not been developed at all, and others to only a very limited extent, during the period which this report covers.

1. Winter Courses.
2. Farmers' Week.
3. Conventions.
4. Visitations and excursions.
5. Correspondence.
6. Exhibits at county fairs.
7. Exhibits at conventions, etc.
8. Exhibits on trains.
9. Farm advisory work, covering all phases of farming.
10. Advanced registry service.
11. Cow testing associations.
12. Breeding associations.
13. Corn associations, etc.
14. Co-operative buying and selling associations.
15. Educational trains.
16. Demonstrations for putting into effect well-established principles in the use of fertilizers.
17. Demonstrations for putting into effect well-established principles in the growing of alfalfa.
18. Demonstrations for putting into effect well-established principles in orchard fertilization and treatment.
19. Demonstrations for putting into effect well-established principles in feeding hogs, etc.
20. Demonstrations for putting into effect well-established principles in the growing of soy beans.
21. Demonstrations for putting into effect well-established principles in the use of vegetable seeds.
22. Boys' and girls' clubs.
23. Assistance to creameries—manufacturing side.
24. Publication of circulars.

25. Publication of The Extension Bulletin.
26. Press notices—information of interest to farmers. Agricultural press.
27. Press notices—information of interest to farmers. County papers.
28. Press notices—information of interest to farmers. City papers.
29. Extension Representatives.
30. County Farmers' Weeks and local special meetings.
31. Judging service.
32. Landscape gardening.
33. General lecture service.

Detailed Summary of Activities

1. **Winter Courses.** These courses have been established for the large number of men and women who are not able to spend four years in college, but who can devote twelve weeks during the winter months to association and study with others who are engaged in practical agriculture and creamery work. The work is offered by subjects and not by courses in order to afford the student an opportunity to specialize.

In the last year the courses began December 3 and closed February 27. One hundred and seventy-six students were enrolled. Fifty-two counties of the state were represented in this enrollment. In three instances husband and wife were registered in the courses. Twelve of the students in attendance, who had availed themselves of a winter course within recent years, returned to pursue subjects which it had previously been impossible to include in their schedules, as well as to repeat some subjects which they had found particularly helpful. This fact may serve as an indication of the practical benefit of the work.

2. **Farmers' Week.** This is a week of meetings designed to place the facilities of the institution at the service of the farmers of the state. It is of necessity held during the college vacation and the dates this year (1913-14) were December 29 to January 3.

One hundred and fifty lectures and practical exercises bearing upon all phases of agriculture believed to be of interest and help to Pennsylvania farmers were provided. There were sectional meetings througout the week for those interested in Agronomy, Animal Husbandry, Dairy Husbandry, Fruit Growing, Vegetable Gardening, Floriculture, Landscape Gardening and Home Economics, as well as many additional exercises of general and special character.

Nine hundred and eighty-two people registered, and there were present many who failed to register, so that the actual attendance for the week was considerably over 1000. Sixty-two of the sixty-seven counties of the state were represented.

The following tables show the growth in attendance, the distribution and the counties represented in 1913-1914:

Year	Registration	Counties
1906-07	185	36
1907-08	400	50
1908-09	458	55
1909-10	563	56
1910-11	474	58
1911-12	587	57
1912-13	678	59
1913-14	982	62

Registration for Farmers' Week by Counties, 1913-14

Adams	2	Fulton	2
Allegheny	18	Greene	1
Armstrong	6	Huntingdon	16
Beaver	1	Indiana	24
Bedford	8	Jefferson	7
Berks	7	Juniata	2
Blair	30	Lackawanna	12
Bradford	31	Lancaster	21
Bucks	5	Lawrence	3
Butler	9	Lebanon	4
Cambria	19	Lehigh	3
Cameron	0	Luzerne	15
Carbon	2	Lycoming	16
Centre	372	McKean	1
Chester	37	Mercer	15
Clarion	10	Mifflin	26
Clearfield	19	Monroe	0
Clinton	7	Montgomery	16
Columbia	8	Montour	2
Crawford	4	Northampton	2
Cumberland	7	Northumberland	18
Dauphin	5	Perry	5
Delaware	11	Philadelphia	10
Elk	0	Pike	0
Erie	7	Potter	4
Fayette	4	Schuylkill	2
Forest	0	Snyder	5
Franklin	12	Somerset	3

Sullivan	1
Susquehanna	3
Tioga	12
Union	21
Venango	7
Warren	4
Washington	24
Wayne	8
Westmoreland	18
Wyoming	2
York	7

3. **Conventions.** Conventions of various organizations interested in agriculture from one standpoint or another, frequently meet at the College.

The first Cattle Feeders' Convention ever held in Pennsylvania occurred at the College in April. The experiments in feeding beef cattle, which have been conducted throughout the winter by the Department of Animal Husbandry, were concluded at that time and the results outlined to those present. The attendance was good. The meeting served to bring those specially interested together and help to emphasize the growing importance of this industry.

The summer meeting of the State Horticultural Association took place at the College in June. In addition to the usual program, those present were shown the various lines of investigational work, special emphasis being as a matter of course placed upon the horticultural activities.

4. **Visitations and Excursions.** Many persons, singly and in groups, have visited the College during the year. Every endeavor has been made to give to visitors full information regarding the school and its various activities.

In order to afford the farmers in various sections of the state an opportunity to view the institution and to observe the results of field experiments at the most advantageous season of the year, the Pennsylvania Railroad ran five one-day excursions to the College in June. One of these excursions included the territory tributary to the Main Line from Coatesville to Harrisburg; a second, the Northern Central Division from York to Harrisburg and from Elmira, New York, to Williamsport, as well as the Cumberland Valley and the Lewisburg and Tyrone Branch; a third, the Middle Division from Harrisburg to Tyrone and the Bald Eagle Valley; a fourth, the Bedford Division from Bedford to Tyrone; and a fifth, from Pittsburgh. These trains brought an aggregate of 4000 people to the College. All of these visitors were taken over the 1400 acres of farm land controlled by the College. The results of experiments and the practical application of those results to field practice were observed. The various points of interest on the campus where valuable experimental work is carried on, such as the Respiration Calorimeter, the Creamery, and the Dairy and Animal Husbandry Barns, were included in the itinerary. The remaining agricultural buildings and those devoted to the other schools of the College were also visited.

These excursions have proven to be a very satisfactory method of getting into effective touch with the farmers. It is certain that the farmers as well as those connected with the institution, are appreciative of the efforts of the railroad company to bring about a closer contact and a better understanding between the agriculturists of the state and their state institution.

5. Correspondence. The correspondence of the Department has been heavy. During the year approximately 10,000 letters have been written. In addition to the correspondence of the Extension office, thousands of letters in reply to specific inquiries have been written by the other departments in the school.

6. Exhibits at County Fairs. For a number of years an educational exhibit has been made by the College at county fairs. The display is assembled in duplicate and consists of concrete illustrations and charts showing the results of experimental work and suggesting the application of these results to farm practice. In addition to such material, types of livestock representative of the leading breeds of dairy cattle, beef cattle, sheep, and swine, are shown. A printed statement setting forth the conformation of the ideal animal and indicating the strong and weak points of the specific animals exhibited is attached to the pens or stalls.

This exhibit has been greatly expanded, and, during the fair season of the year which this report covers, it was for the first time displayed in large tents 30 by 80 feet. Two demonstrators from the College accompanied each exhibit in order to meet the people and to answer inquiries. Fourteen fairs were visited and approximately 500,000 people passed through the tents.

7. Exhibits at Conventions. During the year a part of the above educational exhibit was shown at the joint meeting of the State Breeders' Association, the State Horticultural Association, and the Dairy Union. In such instances effort is made to present a more specialized exhibit along the line of the interests represented by the associations.

An exhibit was also sent to the National Corn Show, which was held at Dallas, Texas, February 10 to 24. Agricultural Colleges and

Experiment Stations representing 27 states sent exhibits to that show. Endeavor is usually made to have each Experiment Station set forth a few of its chief lines of work. The exhibit of this College was grouped about three main features: The General Fertilizer Series, the work in Orchard Fertilization and Management, and the Respiration Calorimeter.

The competitive exhibits of corn for which prizes were offered are made a part of the display of each state. It is of interest to note that in the eastern zone, which comprises the New England states, New York, New Jersey, Delaware, Maryland and Pennsylvania, Pennsylvania was awarded six first prizes out of a possible number of eight. The sweepstake prize, however, was awarded to an exhibit of white dent corn from Maryland.

This exposition—it is in reality an exposition rather than a corn show—offers excellent opportunity for a study of the work of other institutions and for a conference among men from other states.

The National Corn Association pays the expenses of two men from each institution. The railroads return exhibition material without cost so that the expense to the College is not large.

8. **Train Exhibits.** Large portions of the material outlined in Paragraphs 6 and 7 are used in train exhibits. It is the endeavor, however, to have these exhibits confirm to the special purpose which the train is intended to serve as well as to the interests of the section of the state in which it is run. One such exhibit (the greater part of which was devoted to problems connected with the selection and treatment of seed) was on view for ten days by co-operation with the Lehigh Valley Railroad. Further reference to this train will be found in Paragraph 15.

9. **Farm Advisory Work.** Requests for examination of farms and suggestions for methods of treatment have been more numerous than ever before.

During the year, 70 visits to farms were made. In each instance at least one day was required and often as much as two days were spent in studying conditions. A detailed record of these conditions, together with the recommendations made, are kept in the office. This makes subsequent suggestions easier and more definite. Some of the more important problems met in this connection included formation of policy, general farm management, crop system, barn plans, fertilization, rations for animals, trucking, orchard treatment and management, the use of lime, alfalfa, the production of hogs and sheep, the feeding of beef cattle, as well as assistance in developing a proper system of accounting. Individual assistance of this sort often benefits a large number in a community.

A number of public and semi-public institutions like county poor farms are included in these visits; in such instance, the service is much wider in scope.

No charge is, of course, made for this service, but those asking it usually pay the necessary traveling expenses.

A larger number of people are reached and helped than is represented by the number of farm visits made. Frequently, during a farm examination, groups of farmers in the vicinity get into touch with the man from the College, and many questions are asked and answered.

10. **Advanced Registry Service.** The supervision of the Advanced Registry work is in charge of the Dairy Husbandry Department in the report of which details of such service may be found. Since this is an outside activity, however, mention of it should be made here.

11. **Cow-Testing Associations.** Pennsylvania has large dairy interests, ranking eighth among the states in the value of dairy products. In a dairy community, a cow-testing association is one of the very best means of advancing the interests of individual farmers as well as of the community as a whole.

A group of dairymen, whose herds aggregate about 600 cows, form an association and employ a trained man, who spends one day of each month with each member of the association. The milk from each animal is weighed and tested for butter-fat. The feed is weighed, and such suggestions as may seem desirable for more economical feeding are made. At the close of the year, every man is given a statement showing the amount of milk and butter-fat each animal has produced, together with the cost of the feed consumed. It is frequently found that many cows are producing milk at considerable loss. It costs no more to feed and care for a good cow than for a poor one and the cow-testing association shows the owner of each herd the unprofitable animals and makes possible their elimination.

Two new associations have been formed during the year and assistance has been given three others previously organized. These associations involve 2500 to 3000 cows. Foundation has also been laid for the formation of a number of additional associations in the near future.

12. **Breeding Associations.** Breeding associations are formed for the purpose of improving the live stock of a community by encouraging the use of pure-bred male animals. One such association has been organized during the year.

13 and 14. **Corn Associations and Co-operative Buying and Selling Associations.** No new organizations have been promoted during the year but assistance has been given to a number of associations.

15. **Educational Trains.** One such train, in co-operation with the Lehigh Valley Railroad, reference to which was made under Paragraph 8, has been operated this year.

The importance of proper selection and treatment of seed and of problems in dairying was emphasized. The train was run for a period of ten days. It made ten stops in Luzerne, Wyoming and Bradford counties. No formal meetings were attempted, but in the periods of six to ten hours during which the cars stopped at each station, people were invited to view the exhibits and to talk with the demonstrators. This method operated very satisfactorily. Twenty-five hundred people passed through the coaches and conferred with the men in charge.

16, 17, 18, 19, 20 and 21. **Demonstrations.** For present purposes these several demonstrations may be grouped together. Less work is being done at the present time than in previous years. Tests with fertilizers are being conducted in various parts of the state. A few experiments with soy beans to determine varieties best suited to a particular locality have been made. These tests have proved very helpful to the counties in which they have been placed.

22. **Boys' and Girls' Clubs.** Recognition of the importance of interesting and inspiring the young people of the country in the improvement of the character and yield of crops through the work has attracted considerable attention. The numbers interested have greatly increased during the year. This has been true particularly in many counties where Extension Representatives are working.

Nearly 500 boys have taken an active part in various phases of club work. About 150 samples of corn were entered in competition at the "round-up" show held at the College during Farmers' Week. At present, several hundred more are engaged in club work for the coming year. Every endeavor is made to have this activity closely associated with the public schools. In fact, the aim has been to encourage local movements by placing all responsibility in the hands of county superintendents and local school authorities. This Department has then acted as a clearing-house to bring all parts of the state together in a general competition. Close co-operation with school authorities is desirable to insure success.

It is realized that in very many instances general competition works an injustice, because of the inability of many counties to compete with those more favorably located. It is hoped that in the future, districts may be created in which competition will be more nearly equal.

This movement has reached such proportions and has so many ramifications, that an assistant should be appointed who could devote his whole time to supervising club organization.

23. **Assistance to Creameries.** The farmer who takes his milk and cream to the creamery or cheese factory, should benefit in proportion to the efficiency with which such manufacturing establishment is conducted. A few creameries are co-operative and the interests of the creamery and of the patrons are one. Many calls for assistance in the manufacture of dairy products have come to the Department. About twelve creameries have been visited, several days being spent at each in studying conditions, answering specific inquiries, and making suggestions for improvement.

One of these creameries, making an average of 800 pounds of butter per day, very well illustrates possibilities. It was claimed by the creamery man that it was not possible to make an over-run greater than 15 per cent. As a result of following well-defined principles, it was shown that an over-run of 22 per cent was obtained. This is a co-operative creamery and the foregoing result means, estimating conservatively, 1½ cents a pound more for butter-fat, or an addition of about $4,000 to the year's production.

24. **Circulars.** A series of four-page circulars bearing upon subjects of frequent inquiry, has been prepared. These circulars are designed to reduce correspondence rather than for general distribution to a mailing list, although they are available for anyone desiring them. They now number 42, six having been prepared during the year. A list follows:

1. Commercial Fertilizers.
2. Analysis of Soil and Miscellaneous Material.
3. The Use of Lime on Land.
4. Alfalfa.
5. Hatching Chicks with Incubators.
6. Poultry Houses.

7. Orchard Renewal.
8. Selection of Feed for Dairy Cows.
9. Suggestions for Feeding Dairy Cows.
10. List of Books for a Farmer's Library.
11. Feeding for Winter Eggs.
12. Cover Crops for the Orchard.
13. Strawberries.
14. The Propogation of Orchard Fruits.
15. The Planting of Orchards.
16. Pruning Fruit Trees.
17. The Blackberry.
18. The Raspberry.
19. Corn Growing Contest for Boys.
20. Soil Fertility.
21. Fertilization of Mowing Lands.
22. An Old Crop Rotation.
23. Market Gardening.
24. Potato Culture.
25. Remodeling an Old Dairy Barn.
26. Feeding Cattle.
27. Pig Feeding.
28. Ginseng and Its Cultivation.
29. Window Gardening.
30. Corn Growing and Improvement.
31. Fertilization of Orchards.
32. Orchard Spraying.
33. Making Grain Mixtures for Dairy Cows.
34. Corn Culture.
35. Corn and Potato Growing Contests.
36. Co-operative Experiments.
37. Drainage of Wet Land.
38. Organic Matter Essential to Soil Fertility.
39. Poultry Houses.
40. Dairy Farming.
41. Clean Milk.

25. **The Extension Bulletin.** The necessity of some means of keeping in systematic touch with those interested in agriculture and of sending out general information, which cannot be included in the regular research bulletins, has long been evident. To supply this need, a monthly publication, known as "The Extension Bulletin" has been initiated. Thus far nine numbers of this publication have been sent to more than 35,000 Pennsylvania residents whose names appear on the mailing list of the Experiment Station.

26, 27 and 28. **Press Notices.** The agricultural papers are appreciative of items of interest from the College. A number of articles have been furnished these papers which have also generously alloted space to information in regard to activities at the College, such as Farmers' Week, etc.

Numerous requests are received from county newspapers desirous of printing information helpful to their rural readers. These requests have been met and a few articles have been sent to all county newspapers.

From time to time articles have been prepared for the city press. Obviously the character of the material furnished these various classes of papers must be variable. All these lines of news service have possibilities for further development.

29. Extension Representatives. One of the most efficient channels of extension service is the Extension Representative. This work has developed perceptibly during the year. Ten representatives are now at work in as many counties of the state. The preliminary arrangements have been completed for establishing an additional Representative July 1. This one is included in the following list of counties and their agents.

County	Representative	No. of months agent has been employed
*Bedford	A. B. Ross	..
Berks	C. S. Adams	3
Blair	R. Bruce Dunlap	22
Bradford	D. K. Sloan	16
Butler	H. S. Adams	22
Chester	Charles F. Preston	11
Lancaster	F. S. Bucher	16
**Lycoming	R. H. Bell	..
Mercer	C. G. McBride	21
Montgomery	A. K. Rothenberger	22
Washington	J. M. McKee	22

*The work in Bedford County is on a somewhat different basis from that of the other counties.

**Begins July 1, 1914.

In all counties except Bedford an active local organization, usually called a Farm Bureau, has been formed to assist the Extension Representative, and to it a large part of the credit is due for making this work effective and successful. Movements toward an organization in the near future have been started in the following counties:

Allegheny.
Cambria.
Clearfield.
Columbia.
Erie.
Fayette.
Indiana.
Lackawanna.
Luzerne.
Warren
Westmoreland.

Financial support for this movement has three sources: the National Government, through the co-operation of the U. S. Department of Agriculture, the College, which represents the contribution of the State, and the local people. Prior to 1913, there was no authorization for the county commissioners to appropriate funds for this purpose. The last Legislature passed an enabling act and now in a majority of the counties some of the local funds are obtained by appropriation from the county treasury.

The following table indicates the amounts contributed by the various contributing agencies:

County	College	U. S. Dept.	County Commissioners	Local Organization	Total
Bedford......	$100	$2700			$2800
Berks.........	100		$1200	$1700	3000
Blair..........	100	1100	600	400	2200
Bradford......	600		300	600	2400*
Butler.........	100	1100	1000	500	2700
Chester.......	100		1000	1700	2800
Lancaster.....	100	1200		1300	2600
Mercer........	100	1700	1000	500	3300
Montgomery..	100	1200	1000	400	2700
Washington...	100	1200	1000	300	2600

*The Pennsylvania Railroad is contributing $900.

In addition to the above sums, the College pays one-half of the salary and expenses of the man supervising the details of this work, as well as the necessary office expense in this connection. In many counties, in addition to cash contributions, office room and expenses are provided by local chambers of commerce.

It is the general policy of the United States Department of Agriculture to contribute during the coming year an amount not to exceed $1200 per year.

Beginning July 1, 1915, the foregoing will be reduced to a sum not to exceed $600 per county.

The passage of the Smith-Lever Act will make it possible for the College to contribute a sum in each instance more than sufficient to meet the funds being withdrawn by the United States Department of Agriculture. After July 1, 1915, the general policy of assigning sufficient funds at least to provide for the salary of the man employed, and leaving the necessary expenses to be taken care of by the county, will be adopted.

The following conservative figures collected from the reports of Extension Representatives may afford some idea of the extent of service rendered:

Farmers visited at their farms	4100
Calls on Agents at their offices	2000
Farmers' meetings attended	810
Corn clubs organized	26
Articles published in local papers	225
Students influenced to attend College	40
Farmers influenced to attend Farmers' Week	122
Farmers' excursions	13

That excellent service is being rendered is evident from the satisfactory reports from counties in which representatives are located, as well as from the requests for Representatives from counties which have been closely observing the results in territory where the idea has been in operation.

The growth of the Extension representative movement is limited as much by lack of properly qualified men to enter the field as by lack of financial support.

30. **County Farmers' Weeks.** No such meetings have been held this year.

31. **Judging Service.** There has been a great demand from fairs and other organizations for men to judge stock of all kinds, poultry, farm crops, horticultural and dairy products, etc. These requests have been met so far as possible and during the year 25 different exhibits have been judged. Frequently a demonstration has been given in connection with official judging.

32. **Landscape Gardening.** Plans for the improvement of 30 school grounds in different parts of the state have been prepared and some supervision has been given to the working out of these plans.

Service has also been rendered by providing and helping to execute plans for a number of parks, play grounds and other public or semi-public grounds, such as those connected with hospitals, churches, county buildings, etc., as well as for a few private individuals. One very important piece of work, for the proper execution of which special knowledge and experience in tree surgery are indispensable, has been the supervision of the care of trees in the Capitol Park at Harrisburg.

33. **General Lecture Service.** Addressing agricultural meetings of various kinds upon subjects of special interest has constituted a large field of service. Three hundred and fifty such lectures have been given and these meetings have included practically every county in the state. This number is equivalent to a lecture away from the College every day throughout the year. Forty thousand people have been reached by these speakers from the School of Agriculture and Experiment Station.

The Future.

Among new projects, which offer opportunity for helpfulness and which are numbered consecutively with those already outlined, the following are suggested:

34. Better Seed Propaganda.
35. Co-operation with the public schools in an organized way.
36. Improvement of farm-home grounds.
37. Home economic activities.

All the projects outlined are susceptible of much larger development.

The Smith-Lever Bill.

The Smith-Lever Bill, providing funds with which the Land Grant Colleges may carry on Extension work in Agriculture and Home Economics, was passed, practically unanimously, by Congress and signed by the President in May. A copy of this act is as follows:

An Act to provide for cooperative agricultural extension work between the agricultural colleges in the several states receiving the benefits of an Act of Congress approved July second, eighteen hundred and sixty-two, and of Acts Supplementary thereto, and the United States Department of Agriculture.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That in order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same, there may be inaugurated in connection with the college or colleges in each state now receiving, or which may hereafter receive, the benefits of the Act of Congress approved July second, eighteen hundred and sixty-two, entitled "An Act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts" (Twelfth Statutes at Large, page five hundred and three), and of the Act of Congress approved August thirtieth, eighteen hundred and ninety (Twenty-sixth Statutes at Large, page four hundred and seventeen and chapter eight hundred and forty-one), agricultural extension work which shall be carried on in co-operation with the United States Department of Agriculture: Provided, That in any state in which two or more such colleges have been or hereafter may be established the appropriations hereinafter made to such state shall be administered by such college or colleges as the legislature of such state may direct; provided, further, That, pending the inauguration and development of the co-operative extension work herein authorized, nothing in this Act shall be construed to discontinue either the farm management work or the farmers' co-operative demonstration work as now conducted by the Bureau of Plant Industry of the Department of Agriculture.

Section 2. That co-operative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the state agricultural college or colleges receiving the benefits of this Act.

Section 3. That for the purpose of paying the expenses of said co-operative agricultural extension work and the necessary printing and distributing of information in connection with the same, there is permanently appropriated, out of any money in the Treasury not otherwise appropriated, the sum of $480,000 for each year, $10,000 of which shall be paid annually, in the manner hereinafter provided, to each state which shall by action of its legislature assent to the provisions of this Act: Provided, That payment of such installments of the appropriation hereinbefore made as shall become due by any state before the adjournment of the regular session of the legislature meeting next after the passage of this Act may, in the absence of prior legislative assent be made upon the assent of the governor thereof, duly certified to the Secretary of the Treasury: Provided, further, That there is also appropriated an additional sum of $600,000 for the fiscal year following that in which the foregoing appropriation first becomes available, and for each year thereafter for seven years a sum exceeding by $500,000 the sum appropriated for each preceding year, and for each year thereafter there is permanently appropriated for each year the sum of $4,100,000 in addition to the sum of $480,000 hereinbefore provided: Provided, further, That before the funds herein appropriated shall become available to any college for any fiscal year plans for the work to be carried on under this Act shall be submitted by the proper officials of each college and approved by the Secretary of Agriculture. Such additional sums shall be used only for the purposes hereinbefore stated, and shall be allotted annually to each state by the Secretary of Agriculture and paid in the manner hereinbefore provided, in the proportion which the rural population of each state bears to the total rural population of all the states as determined by the next preceding Federal census: Provided, further, That no payment out of the additional appropriations herein provided shall be made in any year to any state until an equal sum has been appropriated for that year by the legislature of such state, or provided by state, county, college, local authority, or individual contributions from within the state, for the maintenance of the co-operative agricultural extension work provided for in this Act.

Section 4. That the sums hereby appropriated for extension work shall be paid in equal semiannual payments on the first day of January and July of each year by the Secretary of the Treasury upon the warrant of the Secretary of Agriculture, out of the Treasury of the United States, to the treasurer or other officer of the state duly authorized by the laws of the state to receive the same; and such officer shall be required to report to the Secretary of Agriculture, on or before the first day of September of each year, a detailed statement of the amount so received during the previous fiscal year, and of its disbursement, on forms prescribed by the Secretary of Agriculture.

Section 5. That if any portion of the moneys received by the designated officer of any state for the support and maintenance of co-operative agricultural extension work, as provided in this Act, shall by any action or contingency be diminished or lost, or be misapplied, it shall be replaced by said state, to which it belongs, and until so replaced no subsequent appropriation shall be apportioned or paid to said state, and no portion of said moneys shall be applied, directly or indirectly, to the purchase, erection, preservation, or repair of any building or buildings, or the purchase or rental of land, or in college-course teaching, lectures in colleges, promoting agricultural trains, or any other purpose, not specified in this Act, and not more than five per centum of each annual appropriation shall be applied to the printing and distribution of publications. It shall be the duty of each of said colleges annually, on or before the first day of January, to make to the governor of the state in which it is located a full and detailed report of its operations in the direction of extension work as defined in this Act, including a detailed statement of receipts and expenditures from all sources for this purpose, a copy of which report shall be sent to the Secretary of Agriculture and to the Secretary of the Treasury of the United States.

Section 6. That on or before the first day of July in each year after the passage of this Act, the Secretary of Agriculture shall ascertain and certify to the Secretary of the Treasury as to each state whether it is entitled to receive its share of the annual appropriation for co-operative agricultural extension work under this Act, and the amount which it is entitled to receive. If the Secretary of Agriculture shall withhold a certificate from any state of its appropriation, the facts and reasons therefore shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the expiration of the Congress next succeeding a session of the legislature of any state from which a certificate has been withheld, in order that the state may, if it should so desire, appeal to Congress from the determination of the Secretary of Agriculture. If the next Congress shall not direct such sum to be paid, it shall be covered into the Treasury.

Section 7. That the Secretary of Agriculture shall make an annual report to Congress of the receipts, expenditures, and results of the co-operative agricultural extension work in all of the states receiving the benefits of this Act, and also whether the appropriation of any state has been withheld; and if so, the reasons therefor.

Section 8. That Congress may at any time alter, amend, or repeal any or all of the provisions of this Act.

According to the last census, Pennsylvania possesses 6.15 per cent of the total rural population of the country and will therefore receive a larger share of the Lever funds than any other state.

When this appropriation is duplicated by the state—a condition required by the Act—a large fund will in a very few years, be available for Agricultural and Home Economics Extension work.

The following table shows how this appropriation becomes available:

Year.	Total Federal funds in addition to $10,000 a year.	Pennsylvania's share of Federal funds under the Smith-Lever Act.	Required from the State.	Total for Pennsylvania
July 1, 1914......	$ 10,000	$ 10,000		$ 10,000
July 1, 1915......	600,000	46,893	$ 36,893	83,786
July 1, 1916......	1,100,000	77,637	67,637	145,274
July 1, 1917......	1,600,000	108,381	98,381	206,762
July 1, 1918......	2,100,000	139,125	129,125	268,250
July 1, 1919......	2,600,000	169,869	159,869	329,738
July 1, 1920......	3,100,000	200,613	190,613	391,226
July 1, 1921......	3,600,000	231,357	221,357	452,714
July 1, 1922......	4,100,000	262,101	252,101	514,202

For the two years covered by the next Legislative period, $104,530 will be necessary to meet the requirements of the Smith-Lever Act.

Respectfully submitted,

M. S. McDOWELL,
Director of Agricultural Extension.

SUMMARY

Number of Extension projects under way	39
Number of counties reached by one or more of these activities	67
Number enrolled in Winter Courses in Agriculture	176
Number enrolled in correspondence courses	4,000
Number on mailing list to whom publications have been mailed at regular periods	45,000
Number of letters in reply to inquiries	20,000
Number seeing Fair Exhibits	500,000
Number reached by remaining activities	55,250
Number of meetings away from the College	350
Total attendance at these meetings	40,000
Excursionists visiting the College	4,000

County Agent Summary

Farmers visited at their farms	4,100
Calls on agents at their offices	2,000
Farmers' meetings attended	810
Corn Clubs organized	26
Articles published in local papers	225

THE EXTENSION BULLETIN

Issued Monthly by the Department of Agricultural
Extension of The Pennsylvania State College

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Vol. II FEBRUARY, 1915 No. 5

The winter courses in agriculture which began December 2, and will close the last of this month, have 212 students enrolled. This enrollment represents 53 counties of the state.

Farmers' Week this year attracted approximately a thousand people. The prevalence of the foot and mouth disease served to keep down appreciably the attendance. Those present for the exercises of the week represented 61 counties of the state. A list of counties with the numbers in attendance from each is as follows:

Adams	7
Allegheny	21
Armstrong	7
Beaver	7
Bedford	4
Berks	17
Blair	37
Bradford	10
Bucks	4
Butler	17
Cambria	18
Centre	180
Chester	18
Clarion	14
Clinton	10
Clearfield	9
Columbia	7
Crawford	7
Cumberland	14
Dauphin	8
Delaware	3
Elk	1
Erie	12
Fayette	4
Franklin	16
Fulton	1
Greene	3
Huntingdon	20
Indiana	19
Jefferson	29
Juniata	2
Lancaster	16
Lackawanna	10
Lawrence	3
Lebanon	14
Lehigh	7
Luzerne	15
Lycoming	35
Mercer	21
Mifflin	17
Monroe	1
Montgomery	19
Montour	10
Northampton	6
Northumberland	13
Perry	1
Philadelphia	14
Potter	4
Schuylkill	6
Snyder	5
Somerset	4
Susquehanna	7
Tioga	6
Union	17
Venango	1
Warren	4
Washington	21
Wayne	3
Westmoreland	14
Wyoming	2
York	6

Was your county represented? If so was it represented by as large a number as should come? Now is the time to make plans for Farmers' Week next year. The dates are December 27, 1915, to January 1, 1916.

Many inquiries are being made concerning the two years' course in agriculture. Persons 18 years of age or over may be admitted to this course if they are well enough prepared in secondary school subjects. Some high school training is preferable but with hard, faithful work grammar school training has served for some students. Beginning September, 1915, the equivalent of one year's farm experience will be required for admission. There are no entrance examinations. This course is meant for the young man who is not prepared for a longer course and who expects to make his livelihood by farming.

The largest item of expense is room and board. This can be obtained for approximately $5.00 a week.

The bulletin giving information about the details of this two years' course may be had upon application.

Anyone wishing admission should send for an application blank.

A letter of honorable dismissal and scholastic standing for the school last attended, together with a statement concerning farm experience, should accompany the application.

Numerous requests for information about agricultural books are received. It is thought that the following list of books may help to stimulate an interest in starting a library:

BOOKS FOR SCHOOL AND FARM LIBRARIES

The author, title, publisher, and list price are given.

AGRICULTURE (GENERAL)

Bailey, Encyclopedia of American Agriculture (4 v.) Macmillan	$20.00
Bailey, The Principles of Agriculture, Macmillan	1.25
Brooks, Agriculture (3 v.) Home Correspondence School	3.50
Davis, Productive Farming, Lippincott	1.00
Halligan, Fundamentals of Agriculture, Heath & Co	1.20
King, Physics of Agriculture, Orange Judd Co	1.75
Massey, Practical Farming, Outing Pub. Co.,	1.50
Warren, Elements of Agriculture, Macmillan	1.25

AGRICULTURAL ECONOMICS (FARM MANAGEMENT)

Bailey, The State and the Farmer, Macmillan	1.25
Bailey, The Training of Farmers, The Century Co	1.00
Boss, Farm Management, Webb Pub. Co	.90
Fairchild, Rural Wealth & Welfare, Macmillan	1.25

Green, Law for the American Farmer, Macmillan	1.50
Hunt, How to Choose a Farm, Macmillan	1.75
Hunt, What a Young Farmer Should Know, Orange Judd Co	1.50
Roberts, The Farmers Business Handbook, Macmillan	1.00
Roberts, The Farmstead, Macmillan	1.25
Taylor, Agricultural Economics, Macmillan	1.50
Warren, Farm Management, Macmillan	1.75
Waugh, Rural Improvement, Wiley & Sons	2.00

BEE KEEPING.

Comstock, How to Keep Bees, Doubleday, Page & Co	1.00

BOTANY.

Coulter, Plant Life & Plant Uses, Am. Book Co	1.20
Farmer, Plant Life, Henry Holt & Co	.50
Ganong, The Living Plant, Henry Holt & Co	3.15
Georgie, Manual of Weeds, Macmillan Co	2.00
Hitchcock, Agricultural Grasses, Macmillan	2.00
Pammell, Weeds of the Farm & Garden, Orange Judd Co	1.50
Sargent, Plants & Their Uses, Henry Holt & Co	1.25
Stevens & Hall, Diseases of Economic Plants, Macmillan (by mail)	2.19

CHEMISTRY.

Bailey, Sanitary & Applied Chemistry, Macmillan	1.40
Hart & Tottingham, General Agr. Chemistry, Authors, Madison, Wis.	1.50
Kahlenberg & Hart, Chemistry & Its Relation to Daily Life, Macmillan.	1.25
Sherman, Chemistry of Food & Nutrition, Macmillan	1.50
Snyder, Chemistry of Plant & Animal Life, Macmillan	1.25

CROPS.

Beal, The Grasses of America, Henry Holt & Co. (2 v.)	5.00
Coburn, The Book of Alfalfa, Orange Judd Co	2.00
Dondlinger, The Book of Wheat, Orange Judd Co	2.00
Fraser, The Potato, Orange Judd Co	.75
Hunt, The Cereals in America, Orange Judd Co	1.75
Hunt, The Forage & Fiber Crops of America, Orange Judd Co	1.75
Sanderson, Insects Injurious to Staple Crops, Wiley & Sons	1.50
Shamel, Manual of Corn Judging, Orange Judd Co	.50
Shaw, Clovers & How to Grow Them, Orange Judd Co	1.00
Shaw, Forage Crops, Orange Judd Co	1.00
Shaw, Soiling Crops & the Silo, Orange Judd Co	1.50
Shaw, Weeds & How to Eradicate Them, Orange Judd Co. (paper) .25	.50
Spillman, Farm Grasses of the United States, Orange Judd Co	1.00

DAIRYING.

Eckles, Dairy Cattle and Milk Production, Macmillan	1.20
Farrington & Woll, Testing Milk & its Products, Mendota Book Co	.90
Lane, The Business of Dairying, Orange Judd Co	1.25
Larsen & White, Dairy Technology, Wiley & Sons	1.40
McKay & Larsen, Principles & Practice of Buttermaking, Wiley	1.50
VanNorman, First Lessons in Dairying, Orange Judd Co	.50
VanSlyke, Modern Methods of Testing Milk & Milk Products, Orange Judd Co.	.60
Wing, Milk & its Products, Macmillan	1.50
Winslow, The Production & Handling of Clean Milk, W. R. Jenkins	2.50

FARM EQUIPMENT.

Davidson, Agricultural Engineering, Webb Pub. Co	1.50
Davidson & Chase, Farm Machinery & Farm Motors, Orange Judd Co.	2.00

Elliott, Land Drainage, Wiley & Sons	2.00
King, Ventilation, Orange Judd Co	.75
Lewis & Chandler, Popular Handbook for Cement & Concrete Users, Norman W. Henley & Co	2.50
Halsted, Farm Conveniences, Orange Judd Co	1.00
Martin, Farm Appliances, Orange Judd Co	.50
Martin, Fences, Gates & Bridges, Orange Judd Co	.50
Ogden, Rural Hygiene, Macmillan Co	1.50
Putnam, The Gas Engine on the Farm, Norman W. Henley & Co	2.50
Sanders Publishing Co., Farm Buildings, Author	2.00
Swartzel, Farm Arithmetic, Orange Judd Co	1.00

FORESTRY.

Cheney, The Farm Woodlot, Macmillan	1.50
Crowell, The Economics of Forestry, T. Y. Crowell & Co	1.50
Bruncken, North Am. Forests & Forestry, Putnam & Sons	2.00
Green, Principles of Am. Forestry, Wiley & Sons	1.50
Keeler, Our Native Trees, Scribner & Sons	2.00
Kellogg, Lumber and Its Uses, Radford Architectural Co	1.00
Van Hise, The Conservation of National Resources in the U. S., Macmillan	2.00

HOME ECONOMICS.

Bailey, The Source, Chemistry & Use of Food Products, Blakiston	1.60
Chapin, Infant Feeding, Wm. Wood & Sons	2.25
Conn, Bacteria, Yeasts, and Molds, Ginn & Co	1.00
Dooley, Textiles, Heath & Co	1.00
Farmer, Boston Cooking School Cook Book, Little, Brown & Co	2.00
Farmer, Food & Cookery for the Sick & Convalescent, Little, Brown & Co.	1.60
Gibbs, Household Textiles, Whitcomb & Barrows	1.25
Griggs, Moral Education, B. W. Huebsch	1.60
Hill, The Up-to-Date Waitress, Little, Brown & Co	1.25
Holt, The Care & Feeding of Children, Appleton & Co	.75
Hunt, The Life of Ellen Richards, Whitcomb & Barrows	1.50
Kinne & Cooley, Shelter & Clothing, Macmillan	1.00
King, Education for Social Efficiency, D. Appleton & Co	1.50
Lincoln & Barrows, Home Science Cook Book, Whitcomb & Barrows	1.00
Richards, Euthenics, Whitcomb & Barrows	1.00
Richards, Art of Living, Whitcomb & Barrows	.50
Richardson, The Woman Who Spends, Whitcomb & Barrows	1.00
Sheppard, Laundry Work, Webb Pub. Co	.60
Trowbridge, The Home School, Houghton, Mifflin Co	.60

HORTICULTURE (VEGETABLE GARDENING AND FRUIT CULTURE)

Allen, Cabbages, Cauliflower, etc., Orange Judd Co	.50
Bailey, Cylopedia of American Horticulture, Macmillan (6 v.)	36.00
Bailey, Gardenmaking, Macmillan	1.00
Bailey, The Forcing Book, Macmillan	1.50
Bailey, Lessons with Plants, Macmillian	1.50
Bailey, The Nursery Book, Macmillan	1.50
Bailey, Plant Breeding, Macmillan	1.50
Beattie, Celery Culture, Orange Judd Co.	.50
Card, Bush Fruits, Macmillan	1.50
Chittenden, Insects Injurious to Vegetables, Orange Judd Co	1.50
Corbett, Vegetable Gardening, Ginn & Co	2.00
Doogue, The Lawn, McBride & Nast	.50
Duggar, Fungous Diseases of Plants, Ginn	2.00
Fernow, Care of Trees, Henry Holt & Co	2.00

French, Beginners Garden Book, Macmillan	.75
Fullerton, How to Make a Vegetable Garden, Doubleday, Page & Co.	1.75
Goff, The Principles of Plant Culture, Orange Judd Co	1.00
Green, Vegetable Gardening, Webb Pub. Co	1.00
Greiner, The New Onion Culture, Orange Judd Co	.50
Hexamer, Asparagus, Orange Judd Co	.50
Maynard, Landscape Gardening, Wiley & Sons	.50
Meier, School & Home Gardens, Ginn	.80
Morse, The New Rhubarb Culture, Orange Judd Co	.50
Parsons, How to Plan the Home Grounds, Doubleday, Page & Co	1.00
Saunders, Insects Injurious to Fruits, Lippincott	2.00
Sevey, Bean Culture, Orange Judd Co	.50
Solataroff, Shade Trees in Towns & Cities, Wiley & Sons	3.00
Thomas, The Amer. Fruit Culturist, Orange Judd Co	2.50
Tracy, Tomato Culture, Orange Judd Co	.50
Watts, Vegetable Gardening, Orange Judd Co	1.75
Waugh, Dwarf Fruit Trees, Orange Judd Co	.50
Waugh, Harvesting, Storing & Marketing Fruit, Orange Judd Co	1.00

LIVE STOCK.

Amer. Standard of Perfection, Am. Poultry Association	1.50
Brigham, Progressive Poultry Culture, Torch Press	1.50
Coburn, Swine in America, Orange Judd Co	2.50
Craig, Judging Live Stock, Kenyon Printing Co	1.50
Craig, Sheep Farming, Macmillan	1.50
Davenport, Principles of Breeding, Ginn & Co	2.50
Day, Productive Swine Husbandry, Lippincott	1.50
Gay, Live Stock Judging, Lippincott	1.50
Gay, Productive Horse Husbandry, Lippincott	1.50
Henry, Feeds and Feeding, Orange Judd Co	2.00
Johnstone, The Horse Book, Sanders Publishing Co	2.00
Mayo, Diseases of Animals, Macmillan	1.50
Mumford, Beef Production, Author	1.50
Plumb, Types and Breeds of Farm Animals, Ginn & Co	2.00
Purvis, Poultry Breeding, Sanders Publishing Co	2.00
Reliable Poultry Journal, Chick Book, Author	.50
Reliable Poultry Journal, Ducks and Geese, Author	.50
Reliable Poultry Journal, Poultry Houses & Fixtures, Author	.75
Reliable Poultry Journal, Turkeys, Author	.75
Roberts, The Horse, Macmillan	1.25
Robinson, Principles & Practice of Poultry Production, Ginn & Co	2.50
Robinson, First Lessons in Poultry Culture, Ser. 1 & 2, Farm Poultry Publishing Co., each	.50
Russell, Scientific Horseshoeing for the Different Diseases of the Foot, Clark	4.00
Shaw, Cattle Feeding & Management, Orange Judd Co	2.00
Shaw, Feeding Farm Animals, Orange Judd Co	2.00
Shaw, Sheep Feeding & Management, Orange Judd Co	2.00
Walters, Genetics, Macmillan	1.50
Wilcox & Smith, Farmers' Cyclopedia of Live Stock, Orange Judd Co	4.50
Wing, Sheep Farming in America, Sanders Publishing Co	1.00

SOILS AND FERTILIZERS.

Hall, The Soil, Dutton	1.50
Halligan, Fertility & Fertility Hints, Chem. Pub. Co	1.20
Hopkins, Soil Fertility & Permanent Agriculture, Ginn & Co	2.75
Hunt & Burkett, Soils & Crops, Orange Judd Co	1.00
Agee, Crops & Methods of Soil Improvement, Macmillan	1.25
Lyon & Fippin, Soils, Macmillan	1.25

Roberts, Fertility of the Land, Macmillan	1.37
Thorne, Farm Manures, Orange Judd Co	1.50
Van Slyke, Fertilizers & Crops, Orange Judd Co	2.50
Wheeler, Manures & Fertilizers, Macmillan	1.00
Whitson & Walster, Soils & Soil Fertility, Webb Pub. Co	1.25

NAMES AND ADDRESSES OF PUBLISHERS.

American Book Co., New York.
American Poultry Association, Beaver, Pa.
P. Blakiston & Co., Philadelphia.
Appleton & Co., D., New York.
Century Co., New York.
Clark, Robert, Co., Cincinnati, O.
Coates, Henry T. & Co., Philadelphia, Pa.
Crowell, Thos. Y., New York.
Decker, John W., Columbus, O.
Dent, J. M., & Sons, Dutton Agents, New York.
Dodd, Mead & Co., New York.
Doubleday, Page & Co., New York.
E. P. Dutton & Co., New York.
Farm Poultry Publishing Co., Boston, Mass.
Ginn & Co., Boston, Mass.
Goff, E. S., Madison, Wis.
Harper & Bros., New York.
D. C. Heath & Co., New York.
N. A. Henley & Co., New York.
Henry, W. A., Madison, Wis.
Home Correspondence School, Springfield, Mass.
Houghton, Mifflin & Co., Boston, Mass.
Holt & Co., Henry, New York.
Huebsch, B. W., & Co., New York.
Jenkins, W. R., New York.
Kenyon Printing Co., Des Moines, Iowa.
King, F. H., Madison, Wis.
Lippincott, J. B., & Co., Philadelphia.
Little, Brown & Co., Boston, Mass.
Macmillan & Co., New York.
Mendota Book Co., New York.
McBride & Nast, New York.
Mumford, A. W., & Co., Chicago.
Orange Judd Co., New York.
Outing Publishing Co., New York.
Prompt Printery, Colorado Springs, Colo.
G. P. Putnam's Sons, 27-29 W. 23rd St., New York.
Radford Architectural Co., Chicago, Ill.
Reliable Poultry Journal, Quincy, Ill.
Revell, Flemming H. & Co., 80 Wabash Ave., Chicago.
Richards, L. S., Marshfield Hills, Mass.
Sanders Publishing Co., Chicago, Ill.
Charles Scribners's Sons, 153-157 Fifth Ave., New York.
Stokes, F. A., & Co., 443-449 Fourth Ave., New York.
The Torch Press, Cedar Rapids, Iowa.
Webb Publishing Co., St. Paul, Minn.
Whitcomb & Barrows, Boston, Mass.
Wiley & Sons, 43 E. 19th St., New York.
Wood & Co., Wm., New York.

MATERIAL FOR AN AGRICULTURAL LIBRARY

Many of the Experiment Stations do not mail their bulletins and reports except to residents of their own states. A few, however, mail them to any one requesting it. The policy of each Station can only be learned by applying to the Director. A list of Stations follow:

THE AGRICULTURAL EXPERIMENT STATIONS.

Alabama—
  College Station: Auburn; J. F. Duggar.*
  Canebrake Station; Uniontown; L. H. Moore.*
  Tuskegee Station: Tuskegee Institute: G. W Carver.*
Alaska—Sitka: C. C. Georgeson.†
Arizona—Tucson: R. H. Forbes.*
Arkansas—Fayetteville: M. Nelson.*
California—Berkley: T. F. Hunt.*
Colorado—Fort Collins. C. P. Gillette.*
Connecticut—
  State Station: New Haven;
  Storrs Station: Storrs;
  E. H. Jenkins*
Delaware—Newark: H. Hayward.*
Florida—Gainesville: P. H. Rolfs.*
Georgia—Experiment: R. J. H. De Loach.*
Guam—Island of Guam: A. C. Hartenbower.†
Michigan—E. Lansing: R. S. Shaw.*
Minnesota—University Farm, St. Paul: A. F. Woods.*
Mississippi—Agricultural College: E. R. Lloyd.*
Missouri—
  College Station: Columbia; F. B. Mumford.*
  Fruit Station: Mountain Grove; Paul Evans.*
Montana—Bozeman: F. B. Linfield.*
Nebraska—Lincoln: E. A. Burnett.*
Nevada—Reno: S. B. Doten.*
New Hampshire—Durham: J. C. Kendall.*
New Jersey—New Brunswick: J. G. Lipman.*
New Mexico—State College: Fabian Garcia.*
New York—
  State Station: Geneva; W. H. Jordan.*
  Cornell Station: Ithaca; B. T. Galloway.*
North Carolina—
  College Station: West Raleigh;
  State Station: Raleigh;
  B. W. Kilgore.*
North Dakota—Agricultural College: T. P. Cooper.*
Ohio—Wooster: C. E. Thorne.*
Hawaii—
  Federal Station: Honolulu; E. V. Wilcox.†
  Sugar Planters' Station: Honolulu; H. P. Agee.*
Idaho—Moscow: W. L. Carlyle.*
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Indiana—La Fayette: A. Goss.*
Iowa—Ames: C. F. Curtiss*
Kansas—Manhattan: W. M. Jardine.*
Kentucky—Lexington: J. H. Castle.*
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  State Station: Baton Rouge;
  Sugar Station: Audubon Park, New Orleans;
  North La. Station: Calhoun;
  W. R. Dodson.*
Maine—Orono: C. D. Woods.*
Maryland—College Park: H. J. Patterson.*
Massachusetts — Amherst: W. P. Brooks.*
Oklahoma—Stillwater: L. L. Lewis.*
Oregon—Corvallis: A. B. Cordley.*
Pennsylvania—
  State College: R. L. Watts.*
  State College: Institute of Animal Nutrition; H. P. Armsby.*
Porto Rico—
  Federal Station: Mayaguez; D. W. May.†
  Sugar Planters' Station: Rio Piedras; J. T. Crawley.*
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South Carolina—Clemson College: J. N. Harper.*
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Tennessee—Knoxville: H. A. Morgan.*
Texas—College Station: B. Youngblood.*
Utah—Logan: E. D. Ball.*
Vermont—Burlington: J. L. Hills.*
Virginia—
  Blacksburg: W. J. Schoene.‡
  Norfolk: Truck Station; T. C. Johnson.*
Washington—Pullman: I. D. Cardiff*
West Virginia—Morgantown: E. D. Sanderson.*
Wisconsin—Madison: H. L. Russell.*
Wyoming—Laramie: H. G. Knight.*

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* Director. † Special agent in charge. ‡ Acting director.

Any one who requests it may have his name entered to receive the Monthly List of Publications of the U. S. Department of Agriculture, Washington, D. C. In this way he may keep informed regarding the Farmers' Bulletins and other publications issued by the U. S. Government, which will be mailed free to any address so long as the supply lasts.

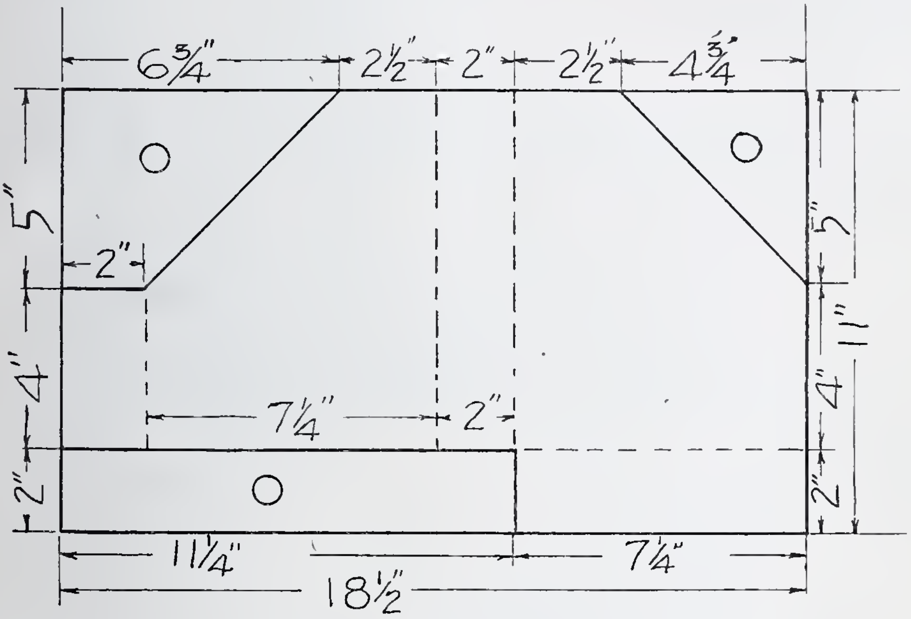
The following Farmers' Bulletins would make a useful Home Economics collection. These and many others may be obtained by applying to the Division of Publications, U. S. Department of Agriculture, Washington, D. C. When the supply at that office is exhausted, they may be purchased of the Superintendent of Documents, Washington, D. C., at five cents each. The latter will not accept postage in payment.

FARMERS' BULLETINS.

No. 34	Meats, Composition and Cooking.
No. 85	Fish as Food.
No. 93	Sugar as Food.
No. 121	Beans, Peas, and Other Legumes as Food.
No. 128	Eggs and Their Uses as Food.
No. 142	Principles of Nutrition and Nutritive Value of Food.
No. 154	Home Fruit Garden.
No. 156	Home Vineyard.
No. 166	Cheesemaking on the Farm.
No. 175	Home Manufacture and Use of Unfermented Grape Juice.
No. 182	Poultry as Food.
No. 183	Meat on the Farm.
No. 185	Beautifying the Home Grounds.
No. 203	Canned Fruit, Preserves, and Jellies.
No. 234	Guinea Fowl and Its Use as Food.
No. 249	Cereal Breakfast Foods.
No. 252	Maple Sugar and Syrup.
No. 255	The Home Vegetable Garden.
No. 256	Preparation of Vegetables for the Table.
No. 270	Modern Conveniences for the Farm Home.
No. 293	Use of Fruit as Food.
No. 295	Potatoes and Other Root Crops as Food.
No. 298	Food Value of Corn and Corn Products.
No. 332	Nuts and Their Uses as Food.
No. 359	Canning Vegetables in the Home.
No. 363	Use of Milk as Food.
No. 375	Care of Food in the Home.
No. 391	Economical Use of Meat in the Home.
No. 389	Bread and Breadmaking.
No. 413	The Care of Milk and Its Use in the Home.
No. 426	Canning Peaches on the Farm.
No. 459	House Flies.
No. 487	Cheese and Its Economical Uses in the Diet.
No. 521	Canning Tomatoes at Home and in Club Work.
No. 526	Mutton and Its Value in the Diet.
No. 535	Sugar and Its Value as Food.
No. 541	Farm Buttermaking.
No. 565	Corn Meal as Food and Ways of Using It.
No. 594	Shipping Eggs by Parcel Post.
No. 607	Farm Kitchen as a Workshop.
No. 608	Removal of Garlic Flavor from Milk and Cream.

HOW TO FORM A USEFUL LIBRARY

There are given below a pattern and directions for a bulletin case. Cases may be made by this pattern by the children in school or at home. There is much free literature which may be collected and formed into a practical library. If bulletins and pamphlets are placed in their individual files upon receipt, they will always be at hand for ready reference.



PATTERN FOR A BULLETIN CASE
Cut off corners containing a O

DIRECTIONS.

Select a piece of strong cardboard 11x18½ inches, and draw upon it the diagram given above.

Cut off the corners containing a circle (0).

Cut the cardboard slightly along dotted lines and bend it away from the cut.

Paste or glue the edges together with strong cotton cloth or photographer's binding, which comes ready to apply.

Suggested Classification for Agriculture and Home Economics.

1 Agr. Expt. Station Reports.
  (Arranged alphabetically by States).
2 Bee-keeping.
3 Buildings.
4 Cattle.
5 Farm Management.
6 Feeds.
7 Fertilizers.
8 Field Crops.
9 Hogs.
10 Home Economics.
11 Horses.
12 Horticulture.
  Flowers and Shrubs.
  Fruit.
  Greenhouses.
  School Gardens.
  Vegetables.
13 Insects.
14 Machinery.
15 Milk and Dairy Products.
16 Roads.
17 Soils.
18 Spraying.
19 Miscellaneous.

As bulletins and pamphlets upon any of the foregoing subjects are received, they may be placed in the filing cases which should be lettered in pencil with the name of the subject.

PENNSYLVANIA PUBLICATIONS

LIST OF AVAILABLE BULLETINS.

The following publications of the Experiment Station are now available and will be mailed free on application:

Reports 1900-1, 1902-3, 1903-4.
Bulletin 61 Report of Director.
" 72 Experiments in Growing Sumatra Tobacco Under Shelter Tent, 1903.
" 96 Cabbage Strain Test.
" 97 Milling and Baking Test.
" 101 Meadows and Pastures.
" 104 The Respiration Calorimeter.
" 105 Influence of Type and Age upon Utilization of Feed by Cattle.
" 108 Test of Oats.
" 110 Control of Insects and Diseases of Horticultural Crops.
" 115 Lime Sulphur Spray.
" 116 Corn Growing in the East.
" 117 Feeding Draft Horses.
" 118 Silage for Steers; Wintering Beef Breeding Cows.
" 119 Cabbage Strain Test.
" 120 Poultry Experiments.
" 121 The Fertilization of Apple Orchards.
" 122 Developing Draft Colts.
" 123 Tuberculosis.
" 124 Steer Feeding Experiments.
" 125 Variety Tests of Wheat.
Bulletin of Information No. 2—Composition of Full Cream Cheese.
" 126 Food as Body Fuel.
" 127 Pennsylvania Limestone and Lime Supplies.
" 129 Strain Test of Tomatoes.
" 130 Tobacco Seed Beds.
" 131 The Use of Lime on Land.
" 132 The Soils of Pennsylvania.
" 133 Steer Feeding.

LIST OF AVAILABLE CIRCULARS.

Circular	No. 1	Commercial Fertilizers.
"	No. 2	Analysis of Soil and Miscellaneous Materials.
"	No. 3	The Use of Lime on Land.
"	No. 4	Alfalfa.
"	No. 5	Hatching Chicks with Incubators.
"	No. 7	Orchard Renewal.
"	No. 11	Feeding for Winter Eggs.
"	No. 14	The Propagation of Orchard Fruits.
"	No. 15	The Planting of Orchards.
"	No. 17	The Blackberry.
"	No. 18	The Raspberry.
"	No. 20	Soil Fertility.
"	No. 21	Fertilization of Mowing Lands.
"	No. 22	An Old Crop Rotation.
"	No. 23	Market Gardening.
"	No. 24	Potato Culture.
"	No. 26	Feeding Cattle
"	No. 29	Window Gardening.
"	No. 30	Corn Growing and Improvement.
"	No. 33	Making Grain Mixtures for Dairy Cows.
"	No. 34	Corn Culture.
"	No. 35	Corn and Potato Growing Contests.
"	No. 36	Co-operative Experiments.
"	No. 37	Drainage of Wet Land.
"	No. 38	Organic Matter Essential to Soil Fertility.
"	No. 39	Poultry Houses.
"	No. 40	Dairy Farming.
"	No. 41	Clean Milk.

LIST OF AVAILABLE EXTENSION BULLETINS.

Bulletin No. 10,	Vol. 1	Peach Growing in Pennsylvania.
Bulletin No. 1,	Vol. 2	Swine Feeding and Management.

THE EXTENSION BULLETIN

Issued Monthly by the Department of Agricultural
Extension of The Pennsylvania State College

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Vol. II MARCH, 1915 No. 6

The Summer session for teachers will begin Monday, June 28, and continue six weeks. A number of agricultural courses will be given at that time. Two of these are of special interest to those engaged in teaching in one-room country schools and township high schools. These are Agricultural Education A, Public School Agriculture, and Agricultural Education D, Rural Education. These courses will be given by the staff of the Department of Agricultural Education and Professor L. H. Dennis, Expert in Agricultural Education, of the Department of Public Instruction, Harrisburg.

The course in Public School Agricultural will consist of such work as may be given in one year of township or high school instruction. Students will devote three hours a day to this course—one hour to recitations and lectures and two hours to laboratory and field work.

The course in Rural Education will present a comprehensive survey of the work of country schools, including organization, program of studies, community work, recreation, elementary agriculture, handwork, and agricultural nature study.

More advanced work in agricultural subjects will be available for those prepared to take it. A catalogue of this work can be had by addressing either the Director of the Summer Session or the Department of Agricultural Education.

Are you planning to test your seed corn?

Good seed is essential. If only a few ears of a lot of seed corn lack vitality the stand of corn will be materially reduced.

A germination test is the only method by which the vitality of every ear may be determined. It pays.

If the present prices of wheat are maintained, it is believed that it would pay many Pennsylvania farmers to top dress their fields of wheat with nitrate of soda and acid phosphate. The amount to apply will be determined chiefly by the condition of the soil and the amount and character of manure or fertilizer applied when the wheat was seeded. In general, 100 pounds of nitrate of soda and 200 pounds of acid phosphate per acre will probably meet the needs. Such an application should be made at the time the spring growth begins.

CONTROL OF POTATO SCAB AND OAT SMUT

It is possible to prevent scab of potatoes and smut of oats by a very simple and inexpensive process. Since these two pests are the source of enormous losses every year to farmers and truck gardeners this preventive treatment is worthy of attention. The treatment consists in soaking the seed grain or potatoes in a solution of formaldehyde and water. These treatments were devised a number of years ago and have been successfully used ever since by a great many and yet the numerous inquiries which come to the Experiment Station indicate that there are still many persons who are not familiar with them.

Formaldehyde. This is a clear colorless liquid with a penetrating odor. It is non-corrosive and essentially non-poisonous. It is so commonly used for disinfectant purposes of all sorts nowadays that practically all drug stores handle it. It is a solution of a gas in water similar to ammonia, and the standard strength is 38-40%. Buying in original, sealed packages is preferable because that makes it certain that there has been no dilution or loss of strength. Bottles or cans containing the mixture, if not kept well stoppered, will allow the gas to escape, thus diminishing the strength. In the potato and oat treatments the standard strength of formaldehyde is added to water so that it is actually used in a very dilute form. In such a weak solution the pungent and irritating odor disappears to some extent. Formaldehyde is sometimes also called formalin, but this a restricted trade name, and in the drug trade the term formaldehyde is much more familiar. The early experimental work was done with an imported product under the name of formalin, a fact which accounts for the introduction and frequent use of that term in the earlier scientific bulletins.

Potato Scab. The roughened, scabby condition of potatoes caused by this disease is familiar to everyone who handles them in the home, market, or field. Scabby potatoes are unsightly and unprofitable. This scabby appearance is not accidental or haphazard but is the result of the attack of a distinct disease. The name is derived from the most conspicuous and important symptom of the disease.

The heavy losses which potato growers suffer every year are brought about in two ways. In the first place there is a reduction in yield owing to the injury which the disease works to the underground portions of the plant, and in the second place there is such a lowering of the quality of the production that many potatoes are unmarketable.

This scab disease is caused by the attacks of a minute fungous parasite and does not occur except where the parasite is present. The disease is carried over winter by germs or spores. These may remain in the old scab spots or they may be mixed with dust and dirt, which cling to the smooth surface. These spores also live over in the soil from year to year. They are even capable of passing through the digestive systems of animals without being killed. Manure from stock fed with raw scabby potatoes becomes a source of infection for the soil.

Since the scab parasite winters over in the scabby spots and even on sound surfaces with which it has come in contact, it is evident that the greatest source of infection is in the seed potatoes. If potatoes free from scab are planted in soil free from it the resulting crop cannot fail to be perfectly sound.

To Prevent Potato Scab. Seed potatoes may be disinfected and made safe for use by soaking them for two hours in a solution of one pint of formaldehyde in thirty gallons of water. Somewhat longer soaking usually will do no harm, especially if the potatoes have not begun to sprout. The actual method of soaking may vary somewhat with the convenience at hand or the ingenuity of the operator. The potatoes may be placed in gunny sacks and suspended in barrels containing the formaldehyde solution. If kept free from dirt and foreign substances the formaldehyde solution may be used repeatedly. If the solution becomes very dirty it is advisable either to increase the time of treatment slightly after the first two or three times or to add a little more formaldehyde. The tanks or barrels should be kept covered.

After treatment the potatoes are ready to be cut and planted as usual, either at once or later. Care must be taken in handling them not to allow reinfection. They should not be put into sacks, bins, or wagons which have not also been disinfected with formaldehyde.

Oat Smut. This is another disease which is caused by a fungous parasite. It is carried over from one crop to another by means of germs or spores clinging to the outside of the seed oats. When the oat seeds begin to grow the fungus grows inside the tissues of the oat plant. Later, when the oat plant blooms, the fungus takes possession and produces masses of its black dusty spores where the oat kernels should be. No oat plant will be smutty unless some of the smut is in contact with the seed when it is sown. Thus, it will be seen at once that clean seed is the solution of the problem. The losses from oat smut are usually very much under-estimated. This is due to the fact that the smutted stalks are as a rule shorter than the healthy ones so that they are overlooked when a field is viewed in the ordinary way. Careful estimates show that the country suffers enormous annual losses each year from this disease and that it is well worth while to take steps toward prevention.

To Prevent Oat Smut. Disinfection of the seed oats with a formaldehyde solution is entirely successful in preventing smut in oats. Spread the seed out on a floor or canvas and sprinkle with a solution of one pint of formaldehyde to fifty gallons of water until moist, but not wet enough to pack in the hand. Shovel over repeatedly to distribute the moisture evenly, then shovel into a pile and cover with sacks or canvas for at least two hours. The seed may then be sown at once or may stand until the next day. If kept longer the grain should be dried as rapidly as possible by spreading it out into a thin layer and stirring occasionally with a rake. Avoid reinfection with smut from smutty sacks, bins, wagon boxes, or seeders. Give them the formaldehyde treatment also. The solution may be mixed in a barrel and applied with a sprinkling can. Each gallon of this solution is enough for a little more than one bushel of oats. This method of seed disinfection is effective also for the stinking smut of wheat.

General. These treatments for both potatoes and oats may be profitably applied frequently, even when the seed is apparently free from the diseases mentioned. In both crops there are other diseases which may be wholly or partially prevented by the formaldehyde disinfectant treatments.

THE EXTENSION BULLETIN

Issued Monthly by the Department of Agricultural
Extension of The Pennsylvania State College

Entered as Second-Class Matter Oct. 30, 1913, at the Post Office at State College, Pennsylvania, under the Act of August 24, 1912.

Vol. II APRIL, 1915 No. 7

SPECIAL ATTENTION IS CALLED TO PAGE THREE OF THIS ISSUE.

Any one who desires to continue to receive bulletins from the School of Agriculture and Experiment Station should fill out promptly the blank on the last page of this bulletin, in accordance with instructions.

A new mailing list will be made of the names of those who fill out and return this blank. Those who do not send the information asked for will not receive the publications of the School of Agriculture and Experiment Station.

No revision of the mailing list has been made for a number of years. Bulletins are being sent to persons who do not receive them, owing to the fact that many have changed their addresses without notifying the College. In some instances, a name appears on the list two or more times, and many persons have died since the list was last revised. Likewise, there must be many who receive bulletins on subjects which have no sort of interest for them. Therefore, in the interest of economy and efficiency, it is desirable to send to individuals only literature upon subjects that are of special interest to them.

Co-operation in the revision of the mailing list will be appreciated and will aid materially in reducing labor and expense. Will each one receiving this bulletin please fill out the blank and return it at once? If more than one copy of the bulletin is received by an individual, only one blank should be filled out.

TURNING DAIRY CALVES ONTO PASTURE.

Under many conditions in Pennsylvania, it is desirable to have cows bred to freshen in the fall. It is possible not only to raise calves to better advantage by this practice, but the mother will do better. The cow, when she is fresh, is stimulated to produce milk, and even under winter conditions she will produce a greater quantity; as spring approaches and she can be placed on pasture, she will usually respond to the stimulating effect of the grass and the spring weather. Also the milk and the butter of cows freshened in the fall usually sell for a higher price during the winter. On the other hand, when the cow freshens in the spring she will do very well for a time, but when warm weather and flies come her milk flow falls off and continues to decrease when she is put into the barn later under winter conditions.

There are many advantages for fall calves. During the fall and winter more time is available on the average farm to devote to the care of the calves, and until they have been weaned there is less trouble to keep the milk. The fall calf will not be annoyed by the flies, and by the arrival of spring it will be large and thrifty enough to turn onto pasture, while the spring calf will be at least a year old before it can have the use of grass alone.

Good, clean pasture should be selected for the young calves, and it is well to keep them by themselves and not to turn them onto large pastures with other cattle or horses. There should be provided also some shade and a supply of good water. A pasture within easy access and so located that young animals can be observed should be selected. Many successful dairymen provide an inexpensive stanchion at some convenient place where the calves can be given skimmilk or grain as they may need it. It pays to watch young calves and to keep them well nourished. Corn and oats make good feed for calves on pasture. One of the best grasses for calves is blue grass, although clover and other legumes may be used. In the case of the latter, however, it is important that they be carefully watched in the morning when there is dew on the grass, or when they have been off the field and go to a clover patch very hungry. Calves often bloat from these grasses. They should not be kept too fat, neither should they be kept housed in a warm stable either winter or summer, but they should have access to fresh air all the time. It is not necessary to keep them fat, but they should be sufficiently well nourished to develop to a good size.

ATTENTION!

It is necessary to revise the mailing list of the School of Agriculture and Experiment Station. If you desire to receive future bulletins, write your **name and address** plainly below, place a cross (X) opposite each subject in which you are interested, enclose this page in an envelope and mail it at once to the School of Agriculture, State College Pa. Do not fail to do this **NOW.**

NAME..

POST OFFICE....................................

COUNTY..

☐ Farm Crops, Soils and Fertilizers.
☐ Dairying.
☐ Horses, Beef Cattle, Sheep and Swine.
☐ Vegetables.
☐ Fruit Culture.
☐ Poultry.
☐ Floriculture.
☐ Forestry.
☐ Tobacco.

THE EXTENSION BULLETIN

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Vol. II MAY, 1915 No. 8

The Pennsylvania Railroad is contemplating the running of a number of excursion trains to the College during the latter part of May and the first of June.

A bill assenting to the provisions of the Smith-Lever Act passed by the last Congress has been signed by the Governor. Pennsylvania will, therefore, be in a position to claim its share of Federal funds when an amount of money equal to that furnished by the Federal Government is made available from within the State.

SOY BEANS.

The culture of the Soy Bean has not become at all general until within the last few years. It is an annual legume of upright, bushy habit of growth. The stems are stiff and the leaves are about as large as those of the common garden bean. The whole plant is covered with short hairs.

Value The soy bean is rich in protein.

Soy bean hay compares favorably with alfalfa hay in digestible nutrients, and has about one-half more digestible protein than red clover hay. The seeds possess a high percentage of protein and oil.

Adaptability—This plant will grow on all good arable soils. It is not especially susceptible to poor drainage, and resists drought well. Cultivation of the soy bean will not revolutionize farming, but it does promise fair returns and is worthy of more extensive cultivation.

CULTURAL METHODS.

Soil Preparation—Preparation of the soil for soy beans may be the same as that for corn. The ground should be plowed early and a good seed-bed prepared. Good growth cannot be secured on an acid soil; therefore lime should be used if needed. No commercial nitrogen need be used but where manure is not used and the soil is not rich, phosphoric acid and potash should be supplied—250 lbs. acid phosphate and 75 lbs. muriate of potash being a fair application.

Inoculation—Nitrogen-gathering bacteria should be introduced where soy beans have not been grown before. The Wisconsin Experiment Station reports better results from inoculation with soil from a field in which soy beans were grown than from the use of pure cultures. Where 200 lbs. of soil are used for an acre the soil may be put into a fertilizer hopper and sown as fertilizer. If the soil is easily obtained more may be used and it may be sown by hand. Pure cultures for inoculating the seed may be secured from a number of commercial firms, or from the Bureau of Plant Industry, U. S. Dept. of Agriculture, Washington, D. C. Neither inoculating soil nor pure cultures should be exposed to bright sunlight.

Seeding—Soy beans may be sown at or after corn planting time. Sown too early, the seed may rot in the ground, especially in case of much rain. In Pennsylvania most varieties require about all of the season for full maturity, and seed should be sown as soon as the season is far enough advanced.

The seed may be sown in rows far enough apart to permit cultivation or with a drill, using every hoe. A comparison of the two methods shows about the same yields of forage. The rows should not be farther apart than necessary for cultivation, a distance usually not over 30 inches. In sowing in this way, a grain drill may be used with some hoes closed, or a corn planter with bean plates, or a good garden drill. The amount of seed required per acre is 18 to 25 lbs.

Cultivation—If seeded in rows the cultivation should be as that for corn—except that more care is required with young plants—and should cease when the plants cover the rows pretty well or come into bloom.

USE OF THE CROP.

Green Feed or Hay—The green forage makes an excellent dairy feed. For best results a number of varities ranging from early to late should be used so that they may be cut when in best condition. They are in best condition when the pods are well formed and the leaves are still on.

Hay—The yields of hay are good, commonly running from 2 to 3 tons per acre. The hay is palatable to all stock. For hay best results will be secured by cutting after the pods are well formed and before the lower leaves fall off. Care must be taken in curing the hay in order that leaves may not be lost. When partly dry the hay should be bunched and then cured in piles or cocks.

Ensilage—Soy beans as an ensilage crop seem to be coming into favor with dairymen. Put into the silo alone, the ensilage develops a rank odor, but when mixed with corn there has been little difficulty in the curing and the product is richer in protein than that from corn alone. When the two crops are grown separately two loads of corn to one load of soy beans should be the proportion. If the soil in which soy beans are grown is stony, the cutter may be injured in harvesting the crop. The corn and soy beans may be grown together and cut with a corn binder. When the two crops are to be grown together the seeds may be mixed and planted with one set of plates. When so grown the soy beans are often tall and spindling and apparently do not make up a large fraction of the total weight.

Production of Seed—The seed is very rich in protein and makes a palatable feed when mixed with corn and other low protein feeds.

The beans may be fed whole to swine and sheep, but it is preferable to grind them for cattle. On account of the high oil content they are inclined to be pasty if ground alone, but they can be ground very well when mixed with corn. The seed has been in such demand for planting that not much has been fed.

The plants should be cut for seed after the pods are well ripened but before shattering begins. With most varieties the leaves will have been lost by the time the seeds are ripe enough to cut. If the crop is very ripe, the cutting should be done early in the morning when the pods are tough from the dew or when the weather is cloudy. A self-raking machine, a grain binder, or a mowing machine with a bunching or windrow attachment may be used.

The stacks should be bunched and dried out well before threshing. When dry they can be threshed quite easily.

Varieties—The eastern seedsmen are advertising about 20 varieties. These differ in length of season, habit of growth, color of seeds, plant hairs, and blossoms, and in productiveness of forage and seed.

Some varieties require a few years to become acclimated when moved from one locality to another.

A list of a few of the better known varieties follows:

Ito San (Yellow, Early Yellow, Medium Yellow, Early White). This is a yellow-seeded variety, one of the best known early varieties. It matures in 100 to 110 days. It is fairly productive of seed but does not give as good yield of forage as most of the later and larger-growing varieties.

Medium Green (Guelph, Medium Early Green), a green-seeded variety, is about 10 days later than Ito San. It is a good variety for forage but cannot be recommended for seed because the pods shatter in the field.

Medium Yellow (Mongal, Roosevelt) is a yellow-seeded variety requiring about the same length of season as Medium Green. It can be recommended as a medium early variety for both forage and seed.

Wilson, is a black-seeded variety which ripens a little later than Medium Green and Medium Yellow. It is later than the varieties mentioned and has slender branches. It is a favorite variety for forage and many growers have secured good yields of seed.

Haberlandt, is a yellow-seeded variety ripening at about the same time as Wilson or just a little later. It has a coarser habit of growth than Wilson. In Pennsylvania localities it has given good yields of forage where it has been tried.

Mammoth Yellow, a yellow-seeded variety, is one of the latest and largest varieties advertised by seedsmen; it is probably more generally advertised than any other variety. It is a splendid variety for states south of Pennsylvania, but can not be recommended except for forage in Pennsylvania, and even then the earlier varieties will probably give feed of better quality. It has coarse stems and should be sown thickly.

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Vol. II JUNE, 1915 No. 9

College Commencement occurs June 6-9. The graduating class numbers 369. Of this number 130 are graduating in the various agricultural courses.

The Pennsylvania Railroad will operate one-day low-rate excursion trains to the College as follows:

Thursday, June 10, From Philadelphia Division, Baltimore Division, and Cumberland Valley R. R.
Friday, June 11, From Pittsburgh and west of Pittsburgh.
Tuesday, June 15, From Middle Division.
Wednesday, June 16, From Elmira Division.
Thursday, June 17, From Bedford Division.
Friday, June 18, From Pittsburgh Division.

The Reading Railroad will operate a similar train from Montgomery and Berks Counties June 1.

SUMMER EGG PRODUCTION.

The low prices prevailing during the summer months tend to discourage efforts at profitable egg production during that season, but the fact that fowls may find a large part of their sustenance in the fields during these months, thus reducing the cost of production, should not be overlooked. Egg production is at its height in March, April, and May, but declines rapidly with the beginning of hot weather. On many farms few eggs are obtained in July and August. By careful attention, however, the poultryman may prolong egg production until late fall and thus increase his returns.

To obtain a profitable yield during the hot weather, the poultry house must be kept cool and comfortable. Glass and muslin windows should make up from one-third to one-half of the front wall area. With the beginning of warm weather, remove all glass windows and keep the house open as much as possible. A ventilator door one foot wide and the length of the house placed just beneath the plate in the rear wall will aid considerably in keeping the house cool. Extreme heat must be avoided.

Cleanliness and freedom from lice and mites is a necessity. Spray the house thoroughly every 10 days, using a pump that will drive the material into every crack of wall, ceiling, floor, nest, dropping boards, and perches. The interior equipment should be portable so as to be more easily sprayed. A commercial lice killer and disinfectant is usually as cheap and more efficient than home-made preparations.

To rid the fowls of body lice, individual treatment with a good lice powder or ointment is necessary. A cheap efficient lice powder may be made of 2½ pounds of plaster of paris ¼ pint crude carbolic acid, and ¾ pint of gasoline. Mix the gasoline and carbolic acid and add them to the plaster of paris. After thorough mixing, put the material through a fine mesh sieve and spread out to dry. The gasoline will evaporate leaving the carbolic acid adhering to the plaster. Sprinkle the powder through the feathers by hand. Two or three applications at intervals of a week or ten days are necessary. Another efficient lice killer is Blue Ointment. A ball of ointment the size of a pea is sufficient for a medium-sized fowl. Apply two or three times with the fingers among fluff feathers, below the vent, under the wings, and at the base of the tail feathers.

Abundant shade must be provided for the fowls. If no natural shade is available, plant a patch of corn or sunflowers near the poultry house. Two large yards or fields should be provided for the poultry house so that a crop for shade or pasture may be grown in one while the fowls occupy the other. Portable colony houses may be placed in the orchard or along the edge of the corn field. If no other shade is possible, erect an artificial shade. A burlap-covered frame elevated 4 to 5 feet from the ground is satisfactory.

Provide abundant pasture. Succulent feed is as necessary for profitable egg production as for milk production. If the fowls cannot be given free range of the orchard, corn field, or hay and grain fields after the crops have been harvested, sow rape in the yards. For early range, oats and Canadian field peas may be sown.

Egg production is influenced by the ration fed. It is advisable to increase the amount of wheat and decrease the amount of corn in the ration during warm weather. The prevailing prices of wheat at present do not justify its use for mature fowls to any great extent. If wheat is worth more than $1.25 per bushel, it may be eliminated entirely. An economical ration for summer under present conditions follows:

Grain	Mash
300 lbs. cracked corn	200 lbs. cornmeal
200 lbs. heavy oats	150 lbs. wheat bran
100 lbs. wheat	100 lbs. wheat middlings
	100 lbs. beef scrap

Only heavy, well-filled oats are suitable for poultry feeding. Light-weight oats of poor quality containing a large proportion of hull are low in digestibility and nutritive value.

The grain should be fed twice daily, early in the morning and late in the afternoon. On free range an ounce to an ounce and a half per fowl will usually be sufficient. The amount should be determined by the appetite and condition of the fowls rather than by any set rule.

The mash is fed dry in hoppers open during the entire day, the fowls being allowed to consume all they will.

An abundance of clean, fresh, cool water is as necessary for summer egg production as is a suitable ration.

A supply of crushed oyster shell and grit should be kept before the fowls constantly

In order to produce eggs of good quality and market them in good condition, produce only infertile eggs for market. The male has no influence upon the number of eggs laid. His usefulness is limited to the breeding season. As soon as the last eggs are set, remove all males from the flock.

Handle eggs as little as possible and keep them in a cool, dry place. Do not wash market eggs. Washing eggs impairs their keeping qualities.

HANDLING THE LAMB CROP.

The two factors that contribute to the profit in sheep raising are wool and the lamb crop. Every sheep raiser recognizes the importance of both crops. He gains the best success in wool production through proper selection of breeding stock, with reference to fleece, proper feed and management for good growth of fiber, and equipment that keeps the fleece clean and full of "luster." But sheep cannot be kept profitably for wool alone, and therefore due attention should be given the lamb crop.

Early-maturing lambs averaging in high condition of flesh from 70 to 90 pounds in weight are in demand on the market. Lambs dropped in January and February may be made to weigh 60 and 70 pounds by May first. Such lambs are in demand and will bring fancy prices.

In Pennsylvania, March lambs are sold "off grass" in the fall of the year. These lambs must be high in condition of flesh, compact in form, and refined in bone and general quality, in order to command the highest market value. Lambs conforming to this description show mutton breeding and the results of good feeding and management.

Castration is necessary for male lambs intended for market after twelve weeks of age. Lambs that are not "dressed" show a lower condition of flesh and possess a tougher texture of meat and command a lower price on the market.

Another important detail is "docking." A few days following castration the lamb should have its tail removed either by cutting the tail off with a knife three-quarters of an inch from the base or with a hot "blacksmith's" pincher. The latter method is the best since practically no blood is lost in the operation. Docked lambs are neater in appearance, carry no filth on the hindquarters, and are freer from fly trouble than lambs that are not docked. They also command a higher net value because of their trimness and uniformity in appearance when sold.

Lambs should be free from sheep tick. If the ewes are infested with sheep tick, the latter may migrate to the lambs after shearing. A good practice is to dip the entire flock once a year. For the dipping, a warm day should be selected. The lambs may be dipped in a tub or barrel filled with a two per cent solution of some standard coal tar disinfectant or other disinfectant suitable for the eradication of tick. The ewes should be dipped in a trough or tank one and one-half feet wide, four feet deep, and eight feet long. The chill should be taken from the dipping solution. To completely eradicate the tick, a second dipping of the flock should be made fifteen days following the first dipping.

A grain mixture of five parts corn, three parts oats, two parts bran, and one part oil meal, or some similiar grain mixture, should be fed the lambs in creeps built for the purpose in the quarters where the sheep are kept at night before and after weaning. As much grain as the lambs will consume in addition to their mother's milk and pasture can usually be fed with a profit. Such lambs make better growth, mature earlier, and will be ready for market at weaning time. They rarely consume more than one-half pound of the grain mixture per head, daily.

After June first, if the lambs are pastured on blue grass with the ewes, the pasture should be alternated every two weeks, in order to prevent the lambs from being infested with worms or parasites. Under intensified conditions of farming it is highly desirable to pasture the ewes and lambs on some forage crop like rape during the early summer. One acre of a good stand of rape should pasture twenty ewes and their lambs for one month. Gradually accustom the ewes and lambs to rape, otherwise deaths from bloat will likely be the result. Bloat may be overcome by giving internally warm cow's milk as soon as possible or in case of necessity by inserting a trocar or knife in the upper left flank of the animal to relieve rumen of the gases present.

Lambs should be weaned at about sixteen weeks and separated entirely from the ewes. If they are not marketed immediately, they should be placed on good pasture. Forage crops like rape, oats, peas, clover and alfalfa, are very good for finishing lambs for market in six to eight weeks after weaning.

Aside from dogs, parasites and especially the stomach worm (Haemonchus Contortus) cause havoc among lambs, when the pastures are not properly rotated or when forage crops are not utilized. Lambs infested with worms become emaciated, sluggish, and appear unthrifty. These kinds of lambs are a "drug on the market." A treatment for stomach worms that is usually successful is as follows:

Keep the lambs off feed for sixteen hours, and then give them a drench of ½ oz. gasoline, 1 oz. raw linseed oil, and 2 oz. cow's milk, all thoroughly mixed together. The lambs should be kept "off feed" for at least two hours, and then allowed to go on pasture for four to six hours. This operation should be continued for three consecutive days to be thoroughly effective.

THE EXTENSION BULLETIN

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Vol. II JULY, 1915 No. 10

Of the 35,000 persons whose names are on the Station mailing list only 6,000 have indicated their desire to be continued as recipients of the publications of the School of Agriculture and Experiment Station. Those who have not filled out and returned the blank which accompanied the April Extension Bulletin should **not fail** to do so **immediately** upon receipt of this notice.

Six low-rate, one-day excursions operated by the Pennsylvania Railroad, and one by the Philadelphia and Reading Railroad during the early part of June, brought 3,500 farmers and their families to the college.

The visitors were shown through the buildings, over the 1,500 acres of farm land and campus, and the various phases of the experimental work were explained.

The following itinerary for the Educational Fair Exhibit which the college sends out has been arranged:

August 24-27, Middletown, Dauphin County.

August 31-September 3, Troy, Bradford County, and Warren, Warren County.

September 7-10, Harford, Susquehanna County, and Titusville, Crawford, County.

September 14-17, Port Royal, Juniata County, and Beaver, Beaver County.

September 21-24, Carlisle, Cumberland County, and Pulaski, Lawrence County.

September 28-30, Forksville, Sullivan County, and Somerset, Somerset County.

October 5-9, St. Marys, Elk County.

The aim has been to send this exhibit to every fair in the State so far as practicable. With the completion of the above circuit, forty-two fairs will have been visited in the past three years, and the exhibit has not been set up at a single fair more than once.

Extension representatives were placed in eight additional counties July 1.

This makes a total of twenty-two counties in which organization of this work has been effected.

A number of other counties have already organized or are preparing to organize farm bureaus.

Requests for information in regard to the organization and operation of a farm bureau may be addressed to the Department of Agricultural Extension, State College, Penna.

EXTENSION ACTIVITIES IN HOME ECONOMICS.

It is the desire of the Home Economics Extension division to render real service to the homes of the State, and to this end various lines of extension work are now being carried on.

Many inquiries are being made concerning the proportion of Smith-Lever funds to be used for extension work in Home Economics.

It is not possible to indicate a definite proportion of funds which will be so used. There are many problems which, although they do not come directly within the province of home economics, still have a very important bearing upon what can be done in the home. In other words, all extension work which brings a larger net return to the farm aids in the solution of the farm home questions.

The college recognizes the importance of the home-economics phase of the extension work, and it will devote a just proportion of funds to that specific form of service.

Bulletins and circulars on subjects of special interest to women will be published from time to time.

Exhibits of illustrative material valuable to the home-maker will be assembled and displayed on the fair circuit.

Home economics courses are offered during the first six weeks of the Short Winter Course. Bulletins may be had upon application.

A Special Farmers' Week program for women will be arranged.

There will be conducted as many two to five-day local meetings as can be arranged. At these meetings lectures and demonstrations in foods, canning, sewing, dressmaking, etc., are given.

Upon request, addresses and demonstrations will be given at special meetings so far as arrangements can be made. Assistance is given at all times in the organization of women's and girls' clubs.

A group of women, however small, may be interested in the study of home problems. Assistance in the organization of a woman's club and in outlining a plan for club study will be given. The women of towns and cities have derived pleasure and profit for themselves and their communities through their women's clubs and organizations; the women of the country must awaken to the fact that the same opportunities and benefits are also open to them. It is simply a matter of recognizing their unity of interests and realizing the possibilities of systematic organization. The college can not give the most effective help unless there is a unity of interest and an organization through which something concrete can be accomplished.

The formation of girls' clubs is one phase of the extension activities in which people throughout the State are becoming more and more interested.

For the most part, these clubs study gardening and canning, bread making, and sewing—the sort of club being organized which meets the interest and needs of a particular section or district.

The Garden and Canning Clubs.—Girls from the ages of ten to eighteen are eligible for membership; older women may be associate members. Associate members attend all meetings, receive all of the instructions and share all of the benefits of the club, but may not compete for prizes.

The girls elect, from among their number, a president, vice-president and secretary-treasurer who conduct the activities of the club and perform the several duties ordinarily assigned to these officers in any organization.

The girls thus learn through practical experience, the methods of organization, the proper method of procedure in conducting a meeting, and the value of business methods and co-operation.

Each club member plants and cultivates her crop according to the instructions of the club leader. This instruction covers all phases of the work; such as the soil needs of different plants; the best methods of fertilization and preparation of the soil; the cultivation of the different crops; the methods of harvesting and marketing the products; the reasons why food materials spoil; the prevention of loss by employing the various methods of preservation; the latest and most approved methods of canning; the use and value of fruits and vegetables in the diet; the advantage of canning the surplus products of the garden and orchard; the superiority of home-canned goods as compared with factory-canned products; the possibility of making the sale of home-canned products a source of profit.

Each club girl keeps an exact record of her work and experiences, and, at the close of the season, writes the story of how she grew her crop. Much of the work of the club may be used as a basis for later school work in language, practical arithmetic, and other subjects.

At the county fair or at the corn and fruit shows held in the various counties, there may be an exhibit of the work of the club and pirzes may be awarded. The points upon which awards are made are the quality of products, the quantity harvested and used, the variety of canned products, the profit, and the story of the work as written by each club member.

It is hoped that the prize-winners will be able to attend Farmers' Week at the college when meetings of especial interest to girls will be arranged.

Sewing Clubs.—The general increase in the cost of living today, the particular increase in the cost of all textile materials, the higher price that has to be paid for having garments made, due to the advance in the price of labor in every line of work, and the inferiority in quality of material and workmanship of ready-made garments are some of the factors which make it desirable and, in many cases, necessary for girls and women to know how to sew and to make their own garments—at least those that are used for every-day wear. This is one of the important reasons for the formation of the girls' sewing clubs.

The method of organization, the officers, the age limit, and the general plan of conducting the clubs are the same as for the canning clubs.

Systematic instruction is given in these clubs also. The girls are taught the proper position of the body while sewing, the use of the thimble, the right way to thread a needle, the correct number of thread to be used with the different sizes of needles, and how to straighten cloth. They learn the various kinds of seams and fundamental stitches and their uses.

They receive instruction in the use of the commercial pattern; in the cutting, fitting, making, and finishing of garments; in darning and mending and the care of garments. There are discussions on such subjects as the choice and economical use of materials; the suitability of different fabrics for different seasons of the year and for persons of different ages and occupations; and the desirability of standards in dress.

The plan for holding exhibits of work accomplished and for the award of prizes is simliar to that for the canning clubs.

Prizes may be provided and awarded on the basis of the number of articles completed and exhibited, on neatness, accuracy of work, suitability of materials, and on the story of the work done in the club.

Bread Making Clubs.—Another popular form of activity for girls' clubs is that of bread making. This is one of the oldest of the household arts and one in which every young woman ought to become proficient.

The method of organization, the officers, the age limit, and the general plan of conducting the clubs are the same as for the canning clubs.

Suitable instruction is given in these clubs also. The girls learn the composition of flour and what constitutes the difference between the spring and winter wheat. They receive instrucion in the process of milling; the nature and use of yeast as a leavening agent; the household methods of bread making; the composition and nutritive value of bread.

They also learn the points to be considered in a good loaf: the general appearance as to size, lightness, and flavor of the loaf; the shape; the character and color of the crust; and the character of the crumb. Comparison of home-made with factory-made bread is made.

After the girls make bread at home a sufficient number of times to master the process and to develop skill, a contest may be held and prizes awarded.

Miss Pearl MacDonald, of the Department of Agricultural Extension, will be glad to supply further details as to the organization and management of girls' clubs, as well as all other phases of home-economics extension activities.

THE EXTENSION BULLETIN

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Vol. II AUGUST, 1915 No. 11

The following additions to the Agricultural Extension staff, which will make possible a wider and more efficient service, have just been made.

A. A. Borland will take charge of the Dairy Husbandry extension work. Mr. Borland is a Pennsylvanian, having been raised on a farm in Mercer County. At his graduation from The Pennsylvania State College in 1909, he received the John W. White fellowship. This fellowship entitled him to spend a year in post-graduate work at the University of Wisconsin, where he received the degree of M. S. After the completion of his post graduate work, he was appointed Assistant in Dairy Husbandry at this institution, where he served for one year. He was later appointed Professor of Dairy Husbandry at the University of Vermont, which position he has held until this time. Mr. Borland has a large acquaintance throughout the State. His ability and wide experience will make him a strong factor in rendering service to the dairy interests of the State.

Miss M. Jane Newcomb will assist in the Home Economics extension work. Miss Newcomb, who was reared on a farm, is thoroughly familiar with rural conditions.. She received her high school training at Rockville, Connecticut, later graduating from the New Britain Normal School, and finally receiving her degree of B. S. in the course in Household Arts at Columbia University. Since graduation she has had eight years of experience in teaching Home Economics in its various phases. She is a woman of splendid ability and good judgment. She has a pleasant manner, meets people cordially, and wins their confidence and friendship.

A. F. Mason will be in charge of Horticultural Extension. After Mr. Mason graduated from the Oregon Agricultural College in 1914, he was awarded the Teaching Fellowship in Agriculture at this institution for the college year 1914-15, where he received the degree of M. S. in June. He has had splendid practical experience in the fruit sections of the West, particularly in the Hood River Valley, and his knowledge of fruit production, packing, marketing, etc., together with some knowledge of the State gained during the past year, and his ability as a public speaker, make him well qualified for this position.

C. M. Arthur, who takes up a more general phase of the Extension Work, completed the course in Horticulture at The Pennsylvania State College in 1913. After leaving College, he served as Assistant Editor of the Pennsylvania Farmer for a year, and then became connected with the Agricultural Extension Service of Rutgers College, New Jersey. In this connection he has rendered valuable service in helping to solve marketing problems and in making addresses at public meetings. Mr Arthur is a fluent writer and he will edit the Agricultural Extension publications.

F. P. Weaver, who for several years has been Instructor in Agricultural Chemistry at this institution, will be associated with the work of the County Extension Representatives. Mr. Weaver will assist in supervising the work of the twenty-two counties now organized and in operation.

Club work has aroused in the last few years a great interest among the boys and girls of the farms. Up to this time it has not been possible for the College to assist in this project in a systematic way. Mr. C. W. Clemmer, a graduate of this College, has been appointed to a position in the department and will devote his entire time to club work.

Beginning July 1 this department becomes responsible for the work of the mailing room which heretofore has been performed by the Library of the school. Mr. H. D. Edmiston who for a number of years has been connected with the Experimental Agricultural Chemistry department will be in charge.

We would again call attention to the necessity of returning the mailing list blank accompanying the April Extension Bulletin. It is urgent that those who have not already marked and returned this blank do so at once.

A large number of applications for admission to the two years' course in agriculture are being received. This work begins September 16. Any person desiring to take this course should make application at once. A bulletin outlining the requirements for admission and the character of the work will be sent upon request.

The six weeks' Summer Session for Teachers opened June 28; over one thousand teachers have been in attendance. This is an increase of twenty-five per cent over last year and is an indication of the esteem in which the courses are held by the teachers of the State.

The Winter Courses in Agriculture and Home Economics will begin this year December 1. The Bulletin outlining these courses is now ready for distribution. Last year two hundred and fifteen students availed themselves of this practical course. Are you interested or do you know of any who might be interested? Requests for information may be addressed to the School of Agriculture, State College, Pa.

SUGGESTIONS FOR MARKETING THE APPLE CROP.

This is a good time to begin considering the various methods of disposing of the apple crop, and to secure the necessary packages for it. The number and kind of the latter will naturally depend on the quality and quantity of the crop.

If the fruit is likely to be low-priced—either because of its low quality or because of the general condition of the market—bulk shipments may be most satisfactory. This method which has been successfully followed in recent instances, saves the cost of packing and packages, and these are becoming important items. If the fruit is carefully handled and shipped to a reliable man in the nearest good market for such shipments, to be sold at once by hucksters or similar people directly to the "ultimate consumer," the net returns are likely to be as high as by any other method.

For fruit that will bring $2 a barrel, or over, some kind of package should be used. The ordinary peach baskets or hampers are often satisfactory for the earlier varieties of apples, if the amount of handling required before the market is reached is not too great.

For the later varieties, barrels or boxes are preferable. For the general wholesale marketing of the East, the barrel is generally best, and the greatest net profits are doubtless obtainable by thoroughly improving and standardizing the methods of packing in it. For the strictly high-grade and high-quality fruit, however, the best returns are generally secured by proper packing in boxes or similar packages and by developing a trade directly with the consumer, or at least a trade that involves no more than one middle-man. The very poor fruit should never be sent to any of the general markets, except possibly in bulk shipments. It should always be disposed of locally, if possible, by means of canneries, evaporators, cider mills, or other special markets.

Box materials can often be secured from local planing mills, or from companies which manufacture such materials. The sizes now most commonly used are 10½ x 11½ x 18 inches or 10 x 11 x 20 inches —all inside measurements. The best material is planed white spruce. The details of box packing are described in Bulletin 298 of the Agricutural Experiment Station, Ithaca, New York; Bulletin 94 of the Agricultural Experiment Station, Corvallis, Oregon; or in the files of the magazine "Better Fruit" published at Hood River, Oregon.

For the extra fancy fruit, the cardboard boxes holding a dozen apples each or thereabouts may often be utilized with excellent results, especially if arrangements for marketing can be made directly with some of the large department stores of the cities. Boxes suitable for shipment by parcels post are also available now, in various sizes and they should afford an abundant and relatively in-expensive opportunity for building up a good trade directly with the consumers.

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Vol. II SEPTEMBER, 1915 No. 12

FARMERS' WEEK IN DECEMBER.

The eleventh annual Farmers' Week of the Pennsylvania State College will be held from December 27, 1915, to January 1, 1916.

This annual round-up for conference along agricultural lines is scheduled during the Christmas vacation period of the College so that ample accommodations can be made for the large number of farmers and their families who attend these meetings.

No definite program has been arranged as yet for Farmers' Week, but announcements concerning such arrangements will be made from time to time.

It is not too early to begin planning to take advantage of this opportunity to meet and exchange ideas with farmers in other parts of the State and to hear discussions and see demonstrations covering all branches of agricultural work.

Large Enrollment For College Year.—The Pennsylvania State College will open for its sixty-first year Wednesday, September 15, 1915. The two days preceding this date will be registration days.

Up to August 1, 1915, five-hundred and twenty-four students had been admitted to the Freshman class in full standing, forty-six of these being female students; sixty-nine had been admitted with thirteen or thirteen and one-half units of entrance credit; and sixteen with at least nine units of entrance credit. At the same period last year only four hundred and seventy students had been admitted in full standing and only twenty-six female students.

Of special interest is the increase in the number of female students and the decrease in the number of students having entrance conditions. No record was available at the time the above figures were reported, as to the individual courses to be pursued by the students already admitted.

Educational Fair Exhibit.—The exhibit prepared by The Pennsylvania State College of Agriculture and Experiment Station, which is to be sent to about a dozen agricultural fairs in the State during the coming season, is an attempt to show, in a practical way, some of the experimental, investigational and educational work which is being carried on at the Experiment Station and Agricultural College.

It covers such subjects as diseases of general and specific crops, including remedies and methods of control; fertilizer experiments on general and specific crops; weeds and methods of destroying them;

balanced rations for beef and dairy cattle, swine, horses and poultry; food materials, and other miscellaneous points.

The expense of the exhibit is borne by the Extension Department of the College of Agriculture and Experiment Station, except the cost for hauling the exhibit from the car to the place of exhibition.

Teacher's Summer Session Successful.—The sixth annual summer session for teachers at The Pennsylvania State College, closed August 6, 1915 after the most successful season on record. The total number of students enrolled was 1024, an increase of 210 over the attendance in 1914, and of 877 over the attendance at the first summer session in 1910.

There were 206 male students and 818 female students. Sixty-six counties were represented. Of the total number enrolled sixty-six students took one or more of the courses offered in agriculture, including rural education or country school agriculture; high school, or secondary agriculture; forestry, dairy husbandry, agronomy and farm poultry.

Greater interest than ever before was manifested in the courses in Rural Education, due to the impetus which has been given the country school movement in recent years.

INFLUENCE OF FEED AND THE EFFECT OF ROTTING ON COMPOSITION OF MANURE.

Influence of Feed.—In a given class of animals the value of manure is determined more by the nature of the feed than by any other fact. The quantity of nitrogen, phosphoric acid and potash in manure stands in direct relation to the quantity of the same ingredients in the feed; therefore the crop producing power of the manure will be greatly influenced by the nature of the food supplied to the animals producing it. The following table published by W. H. Beal in Farmer's Bulletin 192, gives the relative fertilizer value of the various feeding materials;

Fertilizer Value of Nitrogen, Phosphoric Acid and Potash in 2000 pounds of the following products.

	Nitrogen	Phosphoric Acid	Potash	Total Fertilizing Value
Corn meal	$ 4.55	$ .83	$ .31	$ 5.66
Corn silage	.73	.14	.32	1.24
Crimson clover (green)	1.29	.16	.44	1.89
Crimson clover hay	6.63	.82	2.26	9.71
Red clover hay	5.70	.54	1.31	7.55
Gluten meal	15.09	.39	.05	15.53
Cotton-seed meal	20.85	3.66	1.65	26.16
Linseed meal	16.08	2.28	.99	19.36
Meat scrap	29.01	6.01	.67	35.69
Wheat	7.08	.96	.45	8.49
Oats	5.36	.90	.45	6.70
Skim milk	1.74	.26	1.08	2.11
Timothy hay	3.00	.43	1.17	4.60
Wheat bran	7.56	3.40	1.34	12.30
Wheat straw	.81	.30	1.02	2.18
Turnips	.48	.14	.34	.96

Calves on the average return in the manure about one-half of the plant food which is in their feed,; while cows well fed and in full milk, return on the average about two-thirds of the fertilizer value of the feed. Full grown, fattening animals return in the manure most of the fertilizer value of food, on the average from eighty-five to ninety per cent.

Pigs grow the fastest of the farm animals and hence take out much of the fertilizer value, but return on the average about eighty per cent in the manure. The amount of loss would be still greater if it were not for the fact that pigs produce a very small weight in bones and are usually thin-haired. This tendency of pigs to utilize much of the mineral constituents of the feed is also offset by the fact that they are fed generally very concentrated feeds, and pig manure is therefore high in fertilizing value.

With these figures and the table given above, the fertilizer value of the manure produced by feeding one ton of the material noted in the table can be readily calculated. It is evident that so far as value of manure is concerned the concentrated feeding stuffs, such as meat scraps, cotton-seed meal, linseed meal and wheat bran, stand first; the leguminous plants, such as red and crimson clover, etc., second; the cereals, wheat, oats, corn, etc., third; and the root crops, last. Thus with full grown animals neither gaining or losing weight or with animals gaining weight by fattening only, each ton of wheat bran fed would yield manure having a fertilizer value of about $12.30: each ton of clover hay $7.55; each ton of turnips 96 cents. With milking cows only about two-thirds of these amounts, and with growing calves about one-half of these amounts would be obtained. The purchase of a small amount of these concentrated feeding materials will, therefore, go a long way toward replacing the loss of fertilizer due to exportation of such products as wheat, assuming of course that all manure produced, or at least as much as possible, will be returned to the land.

Effects of Rotting.—Manure when exposed to the air decomposes very readily, due to bacterial actions. The bacteria that attack the manure, usually decompose the nitrogenous matter most readily, so that when manure is allowed to rot under the ordinary conditions, the larger part of the nitrogen present in the original manure will pass off in the form of ammonia. Under ordinary conditions of storage, rotting is almost always accompanied by loss through leaching, and since nitrogen and potash are the soluble fertilizer constituents of the manure, these two are the ones that are most diminished. Not only will the nitrogen and potash be greatly diminished in amount, but the entire amount of the organic matter itself will be very much reduced, so that it quite frequently happens that two tons of fresh barn manure will produce about one ton of well rotted manure.

The percentage of nitrogen or the pounds of nitrogen per ton will be about the same in rotted manure as in fresh manure, but the total amount will be diminished about one-half. If conditions are such that leaching is at a minimum, the percentage of potash, or the pounds of potash per ton may be actually increased through this process, although the total amount present is not increased; while on the other hand if the conditions are such that a great deal of leaching takes place, the loss in potash may be greater than the loss in the total organic matter, and the per cent, therefore, will be very much diminished. The loss of phosphorus during rotting is always less than the loss in the total organic matter. Phosphorus will, therefore, increase in points per ton during this process, although the total amount present will be somewhat diminished. As convenient figures for the calculation of the fertilizer constituents present in fresh and in rotted manure, the following may be used:—In fresh manure nitrogen 10 pounds, phosphorus 2 pounds, potassium 8 pounds per ton; and in rotted manure nitrogen 10 pounds, phosphorus 3 pounds, potassium 8 pounds per ton; assuming that two tons of fresh manure will, after six months of rotting, produce one ton of rotted manure.

Prevention of Loss.—How to prevent loss of manure through leaching, fermentation and the draining away of the liquid manure is a matter of great importance.

The liquid manure may be conserved by the use of sufficient bedding to absorb it, and should be collected on some water tight floor such as concrete.

A concrete manure pit prevents leaching and reduces fermentation to a minimum, provided the manure is tightly packed and kept moist.

Probably the cheapest and most efficient way of handling manure, is to spread it on the land as soon as possible after it is produced. By carefully arranging rotations and systems of fertilizing there will be only a short period each year during which there is no place on the farm where manure may be profitably spread. A small cement pit will serve to preserve it during that period.

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Vol. III OCTOBER, 1915 No. 1

Much Interest in Winter Courses. The Winter Courses in Agriculture and Home Economics at the School of Agriculture of The Pennsylvania State College will open December 1, 1915, continuing for a period of twelve weeks.

These courses have been established for the large number of men and women who are interested in agriculture, but who cannot spend four years in college.

The value of the lectures, demonstrations and practical work given in the Winter Course cannot be measured in dollars and cents. They offer opportunity alike to the individual desiring to specialize on some one subject and to the one wishing to combine several subjects. The work is offered by subjects and not by courses, in order that the student may have better opportunity to specialize.

Women are given equal opportunity with men to receive instruction not only in agricultural subjects, but also in the subjects which have a special bearing upon the work of home building.

Living expenses and college fees for the twelve weeks need not exceed $85.00 and may be less. A bulletin giving more detailed information may be secured by addressing Superintendent of the Winter Courses, State College, Centre County, Pa.

Boys' Club Statistics. Mr. C. W Clemmer, who has charge of the Boys' Club work for the Extension Department of the School of Agriculture and Experiment Station of The Pennsylvania State College is attempting to collect some data concerning the work and methods of such clubs as are already organized in the State. The idea in mind is that with such data at hand it will be possible for the College not only to render more intelligent service in the club work, but also to give clubs in different parts of the State the benefit of the successes as well as the failures of similar organizations elsewhere. A prompt response from those to whom inquiries are addressed will be appreciated.

More Counties Organized. Since July first, eight new counties have been organized for Farm Bureau Work and Extension Representatives have been appointed to carry on the activities in these counties.

The list is as follows:

Beaver County	Beatty H. Dimit.
Cambria County	H. C. McWilliams.
Columbia County	J. R. Mathers.
Erie County	S. S. Lehman.
Fayette County	P. E. Dougherty.
Greene County	G. H Bedell.
Warren County	H. N. Reist.
Westmoreland County	L. F. Engle.

Movements are on foot at the present time looking toward the appointment of men in several other counties.

FALL FEEDING OF THE DAIRY COW.

Pasture grass has long been recognized as ideal feed for dairy cows. In any state the maximum profit from the dairy comes while the cows graze. Because of the failure of pasture on account of drought many farmers whose chief income is from dairy cows practice soiling or the use of the summer silo. The farmer who uses either of these two systems has no new problem in the fall so far as his cows in milk are concerned. However, the farmer who is fortunate enough to raise his own stock might have a problem in the fall feeding of his heifers.

FEEDING GRAIN ON PASTURE.

A majority of the dairy cows of Pennsylvania get only grass during the summer. They receive no grain. In Pennsylvania, also, the early summer and early fall pastures are, as a rule, good. Such is not the case during the warmer portion of the summer. During this time, also, while the pasture is short the flies are numerous. The result is shown in a decided falling off in the milk produced. Some of the early experiments in feeding grain on pasture proved that no immediate profitable results could be expected from such a practice. In a general way cows fed grain while on fair pasture will give about one pound of milk for each pound of grain fed. If the pasture is excellent the increase will not be so great. Later studies have shown that even if no immediate profit is made by feeding grain while the cows are on fair pasture, they are kept in so much better condition that their milk flow is continued for a much longer time; and the so-called residual effect of feeding grain on pasture will pay for the practice. There is no question but that the cow fed grain on pasture will give more milk than the one not so fed. If the cows are good producers, undoubtedly the after effect makes this a profitable practice.

Some dairy farmers practice feeding grain to all cows giving over twenty pounds of milk while on pasture. Some such rule is undoubtedly a good one. A poor cow will not pay for grain any time. A good general rule is to feed about one pound of grain for each six pounds of milk while on pasture. When cows are not on pasture the rule is to feed one pound of grain for each three or four pounds of milk. The same grain ration that is fed in the winter will be a good one for summer feeding, provided it is composed of several different feeding stuffs. The feeds should be palatable and rich in protein.

If grain has not been fed during the summer the practice should begin in the fall, especially if milk is desired during the winter. On some farms the use of corn and other crops for partial soiling enables the farmer to put off feeding grain for a longer time. Whether or not the feeding of grain on pasture will be profitable in any one case must be left to the judgment of the particular individual, but if such a practice were adhered to on more farms in Pennsylvania greater profits would be possible than where pasture alone is allowed.

SUPPLEMENT OTHER THAN GRAIN WHILE ON PASTURE.

Corn is the crop most commonly used to supplement pasture, and is one of the best crops for this purpose. It is easy to handle, yields well and is ready for use about the time a decided falling off in milk production is noted. Corn is a good drought resisting plant and hence yields well when other crops fail. It is of little value after the first frosts and hence a field of barley or some of the crops which do well even after frost should be available.

THE SUMMER AND FALL SILO.

The name summer silo explains itself. A silo from which silage can be fed during the summer may now be found on nearly every intensive dairy farm. Many farmers, because of good pasture, do not need silage in the early summer, but when the pasture dries up the summer silo is invaluable. The summer silo may be separate or the regular silo may be of sufficient size to permit the keeping of some silage for late summer and fall feeding before the new product is put in.

Practically all farmers could well afford to begin feeding silage immediately upon the filling of the silo in the fall. The amount of silage fed during the summer and fall varies with the practice on different farms, but about 30 pounds per cow per day is a common amount. It is necessary to feed enough to keep the silage from spoiling in the silo. If some old silage is on hand at time of filling it will keep all right until the next year if covered with the new silage.

PLACE OF FEEDING SILAGE AND SOILING CROPS.

Silage is usually fed in the barn after milking. Unless it can be fed several hours before milking it should always be fed afterward, owing to the danger of the odor permeating the milk. The silo is always near the barn and generally less work is needed to feed the silage there. Soiling crops may be fed just as well in the pasture. Whether the pasture or the barn is used will depend largely upon the distance from the field to the barn or pasture. When the pasture is very short it is probably well to feed some crops there, unless it is thought best to keep the cows in the barn for a large part of the day.

When a small night pasture is provided, feeding racks may be built in the pasture and crops advantageously fed from them. Where soiling crops are fed in the pasture the ground ordinarily will need a raking before winter sets in, as the cows will not eat feed after it has been soiled.

PASTURING ON WHEAT STUBBLE AND ROWEN.

Grazing on clover pasture on wheat stubble is a common practice in Pennsylvania. In pasturing wheat stubble or any new land, care must be taken that the cows do not tramp where the ground is too soft. The fall feeding of clover is not a bad practice, since care must be taken to see that the young clover does not go to seed the first year. Plants which do go to seed will die that winter. Some farmers feed new stubble too closely. A happy medium should be the aim. Because weeds are often found in the stubble fields a weedy flavor gets into the milk unless the cows are taken from such fields three hours before milking.

Rowen may be used for pasture during a good year for this crop. In such a year little can be said against the practice. In years when the rowen is light, undoubtedly close feeding is bad for the grass crop of the following year. The more clover there is in the rowen the better will be the pasture.

FEEDING PUMPKINS, APPLES, CABBAGE, ETC.

A few years ago the fall feeding of pumpkins was very common. When pumpkins will grow well in the corn and help can be secured to cut them up with little real expenditure of cash, feeding them is a good practice. The seeds of the pumpkins may be fed without danger. There is a tradition that pumpkin seeds are injurious. Experiments show that 2½ tons of pumpkins with the seeds are equal to 1 ton of corn silage. Unless labor is cheap, pumpkins are an expensive feed. A cow will eat 25 pounds of pumkins a day without danger of any kind.

Many cows are dried off every fall because they eat too many apples. A few are good for a dairy cow. A cow can eat 25 pounds of apples a day without danger. Apples are about half as useful as the same weight of silage.

In market gardening sections cabbage and other garden truck is often plentiful. In the case of cabbage a good many leaves which cannot be sold are always present. Cabbage has about the same value as silage and can be fed in the same way and in the same amount. This is true of the different roots as well.

Cows should have some succulent feed in the fall and care should be exercised to see that the proper amount of feed is given. Whenever a reasonable amount of concentrates are fed, care should be taken to see that the total ration is sufficient, also that the ration is a balanced one.

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Vol. III NOVEMBER, 1915 No. 2

Large Registration at State College.—Records made at the time of the opening of The Pennsylvania State College in September show that 931 students were registered in the School of Agriculture; 726 in the School of Engineering; 174 in the School of Liberal Arts; 83 in the School of Mines; 181 in the School of Natural Science; and 93 in the Department of Home Economics; a total of 2,188.

There are 642 students in the Freshman class, and of this number 202 will take the course in Agriculture.

The course in Agronomy claims the highest number of students entered in the School of Agriculture, Horticulture ranking second in this particular.

The total enrollment of Sophomores, Juniors and Seniors in the School of Agriculture is 554. Of these, 149 are Seniors, 179 Juniors, and 226 Sophomores. There are 100 students in the first-year class of the two-year course in Agriculture and 102 in the second-year class.

Farmers' Week and State Grange Meeting in December.—The eleventh annual Farmers' Week of The Pennsylvania State College will be held from December 27, 1915, to January 3, 1916.

No definite announcement can be made as yet concerning the program, but it will include speakers from the faculty of the School of Agriculture and Experiment Station staff, who will give lectures and demonstrations on subjects pertaining to agriculture and home economics.

Last year the college gave prominence to the work in Home Economics, and that feature will be emphasized again this year. Lectures and demonstrations in cooking, practical work in garment-making and lectures on textiles and the art of buying will be given. Methods of saving time and labor, the furnishing of the home and the place of art in the home, will receive attention. Several new features will be added this year for the women in attendance.

Exhibits of various kinds will be arranged and the entire week should be helpful both to men and women.

The dairy barn, which last year was quarantined on account of the foot and mouth disease, will be open to visitors during Farmers' Week; the same will be true of all other buildings and laboratories.

A concession has been granted by the railroads in the form of a special rate for visitors to the college who come and return by the same route. This concession will apply also to those who wish to attend the meeting of the Pennsylvania State Grange, which will be held at the college December 20 to 24, inclusive. If desired, this excursion rate may be extended so as to include both the Grange meeting and Farmers' Week.

These two meetings and the excursion rate granted by the railroads should attract a large portion of the agricultural population of Pennsylvania to State College in December.

Home Economics Prominent in Winter Courses.—Only a short time remains before the opening of the Winter Courses in Agriculture and Home Economics at The Pennsylvania State College School of Agriculture.

The establishment of these courses was brought about originally through the realization of the need for them on the part of the large number of men and women, who, though interested in agriculture and engaged in agricultural pursuits, find it impossible to spend four years in college.

These Winter Courses have long since passed the experimental stage and the increase in attendance from year to year is an indication that the agricultural population in the State is finding them extremely valuable.

Living expenses at the college are moderate and the fees in connection with these courses have been reduced to a minimum. Actual living expenses and fees need not exceed $85 and may be slightly less.

Probably most of those interested in these courses are well acquainted with the work offered in agricultural subjects. Practically every branch of agricultural activity is represented.

It is desired, however, to call special attention to the work in Home Economics offered in connection with the Winter Courses. The Home Economics work extends over a period of six weeks, beginning December first, applicants being admitted without examination. Living expenses and college fees need not exceed $50.00.

In addition to the courses in Cookery and Home Nursing offered last year, there will be courses in Dietetics, Household Sanitation and Management, Elementary and Advanced Sewing.

The work in cooking involves a study of the classification, preparation and combination of food materials, the substitution of foods in the diet, the economic use of materials, and present marketing problems.

The course in Dietetics teaches the planning of menus and the food requirements of individuals living under special conditions; the preparation, serving and estimation of cost of given dietaries.

Instruction in simple emergencies and first aid is covered by the Home Nursing course.

The Sewing courses, both elementary and advanced, are as exhaustive as the time allotted will permit.

Household sanitation and management includes a study of the arrangement of the house to save time and energy; a comparison of heating, ventilating, lighting and plumbing methods; a study of the organization and management of the household and of the apportionment and expenditure of income.

Application blanks and full information may be obtained by addressing Superintendent of Winter Courses, State College, Pa.

New Appointments in the School of Agriculture.—The following new appointments to the faculty of the School of Agriculture of The Pennsylvania State College took effect at the opening of the college year in September:

E. O. Anderson, Instructor in Farm Management.
R. A. Andree, Instructor in Farm Mechanics.
H. P. Cooper, Assistant in Agronomy.
R. W. Duck, Assistant in Animal Husbandry.
L. S. Kleinschmidt, Assistant in Poultry Husbandry.
L. F. Reese, Instructor in Horticulture.
D. C. Weimer, Assistant in Agronomy.
L. O. Overholts, Instructor in Botany.
E. A. Siegler, Assistant in Botany.
R. S. Spray, Assistant in Botany.
E. R. Hitchner, Assistant in Bacteriology.
A. Leland Beam, Teaching Fellow in Dairying.
D. B. Etters, Assistant in Dairy Husbandry.

HOGGING DOWN CORN.

Is Hogging Corn Profitable?

Objections are frequently offered to the suggestion that the farmer hog down his corn crop. While this system is not without its disadvantages, an experiment at The Pennsylvania State College School of Agriculture and Experiment Station during the fall of 1913, as well as experiments at other stations, indicates that hogging down at least a portion of the corn crop is profitable, under certain conditions.

In the experiment at the Pennsylvania Station ten hogs were allowed to forage in the corn field and ten others were fed green corn in dry lot. Lot I in the corn field made a daily gain of 1.74 pounds, compared to a gain of 1.45 pounds in the case of Lot II, fed green corn in dry lot. Lot I consumed 98 bushels of corn against 87 bushels consumed by Lot II in the same length of time. Of special interest are the figures covering the gain of the two lots in pounds per bushel of corn fed, and the return per bushel of corn fed in each case. The pasture-lot pigs made a gain per bushel from corn fed of 12.6 pounds, while the dry lot pigs gained 11.6 pounds. The financial return per bushel of corn fed was 93 cents for the pasture-lot pigs and 86 cents for those in dry lot. In both cases the figures given are exclusive of labor costs.

It is not the intention to advocate hogging corn indiscriminately. When the corn can be more conveniently and economically cribbed or put in silage, or when stover is practically necessary, hogging down the crop is not advised. If, however, labor is an important factor and the corn can be utilized to advantage by feeding in this way, the hogging method is a good one. Sometimes corn is blown down by storms and becomes so tangled that it is hard to cut. In such case, and also in the case of frosted corn, the hogs may be turned in to advantage. Provided the essentials for profitable production in the hogging of corn are held in mind, it has been shown by experiments that greater gains in weight are secured by this method than is the case when hogs are fed in dry lot. In any event hogging corn is not advised unless the number of hogs is fairly large.

The labor involved in harvesting, husking and cribbing the corn crop and in feeding the corn to the hogs is saved. Storage also is unnecessary and the corn field is freed from weeds. The fertilizer value of the crop in the form of manure is completely returned to the soil without waste, the corn wasted by the hogs being less than that wasted by the corn binder. The hogs turned loose in the corn field develop vigorous constitutions which result in health, thrift and keen appetites.

Management of Hogs in Corn Field.

In some sections of Pennsylvania where farm labor is scarce the cost of harvesting the entire corn crop is great and the fertility value of crops grown on the farm is an important item. That the proper management of hogs, when they are allowed to harvest the corn, is essential for results goes without saying.

In the first place the hogs should be given access to a limited portion of the corn field. The area should be adjusted so that the hogs will clean up the corn in two or three weeks, when they should be moved to a fresh area.

Hogs of the same size, preferably those averaging between 100 to 170 pounds apiece, should be used. Animals under these averages may be allowed to follow up the area passed over by the fattening hogs.

Fences enclosing the corn fields should be of a portable nature and strong.

Hogs should not be turned into corn until it is dented, and previous to this time they should be brought to a full feed of the green fodder corn, about a week being necessary for them to become accustomed to this feed.

Where it is necessary, artificial shade should be provided for hogs in the corn field.

Hogs on Corn Should Have Supplementary Feed.

Hogs turned loose in the corn field should have supplementary feeds also. The Pennsylvania Station recommends for the purpose a feed rich in protein, a constituent in which corn is somewhat deficient.

Some sow a forage crop with the corn at the last cultivation. Such crops as rape, cowpeas, soybeans, pumpkins, Canada field peas, and hairy vetch are used for this purpose, although even with these crops tankage, skim-milk or butter-milk may be fed with profit. If no forage crop is planted and butter-milk or skim-milk is not available, tankage to the amount of one pound to 400 pounds of live weight should be fed daily. Water should be allowed twice daily and the tankage fed with it.

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DEKALB SOILS SHOW THE NEED OF PHOSPHORIC ACID AND LIME.

As the result of preliminary field and pot experiments on DeKalb soil near Snow Shoe, Centre County, conducted by the Pennsylvania Experiment Station it has been shown that these soils respond quickly to the application of phosphoric acid and lime. On the basis of results obtained in a preliminary way more extensive field experiments have been outlined which have for their object a study of the relative value of various fertilizer treatments suitable for building up worn-out or depleted farm land and the maintenance of permanent pasture on virgin cut-over land.

A field which has been under cultivation for nearly fifty years and is typical of over 50,000 acres of abandoned farmland and virgin cut-over land in the vicinity of Snow Shoe, has been secured for these experiments.

DeKalb soil represents the most extensive agricultural land in the State of Pennsylvania, including over 12,000,000 acres or 43.5 per cent of the total soil area.

The field experiments on the DeKalb soil will be parallel to the plat experiment situated on the State College farm.

Farmers' Week Program Comprehensive.—The program for Farmers' Week which is to be held from December 27 to January 2, at The Pennsylvania State College, embraces lectures on almost every subject of interest to the farmer and his wife.

The dairyman will find lectures and demonstrations covering various phases of dairy operations; the livestock farmer, the horticulturist, the general farmer, and those interested in farm forestry, likewise have all been considered in the preparation of the program. The farmer's wife has not been forgotten, as there will be lectures and demonstrations covering subjects pertaining to household economy.

Members of the faculty of the School of Agriculture will be in charge of this one-week school. Noted authorities from other institutions and men engaged in practical operations in various sections of the country will assist.

Programs may be had upon application to the Department of Agricultural Extension.

STUDENTS WIN CATTLE-JUDGING CONTEST.

In a cattle-judging contest held at the Strathglass Ayrshire Farm, Port Chester, New York, the latter part of October, to which six Agricultural Colleges sent judging teams of three students each, the silver loving cup offered for the team making the highest number of points was won by The Pennsylvania State College team. Out of a possible 1200 points, the State College team made 1046.

Special Railroad Rates for State Grange Meeting and Farmers' Week.—The annual meeting of the Pennsylvania State Grange will be held at State College December 20 to 24. For these meetings arrangements have been made for special excursion rates of two cents per mile in each direction with minimum of one dollar for the round trip from points in Pennsylvania, going and returning by the same route.

For those who wish to attend the Grange Meeting and Farmers' Week also, tickets will be good going December 18-20 and returning not later than January 3. Tickets for Farmers' Week are good going December 25 and returning January 3.

Boy's and Girls' Program.—In recognition of the excellent work which is being done throughout the State by the boys and girls in the club contests special Farmers' Week programs have been arranged for their entertainment and instruction. Demonstrations and talks on selecting seed corn, judging animals, testing milk, seed sowing, transplanting vegetables, pruning and grafting, will interest both boys and girls. Of special interest to the girls will be talks and demonstrations covering proper table service, cutting and making garments, and bread-baking. Instruction in organized play will also be a part of the program.

New Bulletins Available.—Attention is called to several new bulletins and circulars now available.

Bulletin 135, "A Study of The Manufacture of Dairy Butter; Methods of Making Farm Butter," covers experimental work on churning, and directions and methods for making uniform butter of good quality, and outlines the proper care of buttermaking apparatus.

Bulletin 136, "Collar Blight and Related Forms of Fire Blight," is a treatise on the history, economic importance, distribution, symptoms, causes and prevention of this disease and other forms of fire-blight.

Extension Circular 43, "Profitable and Unprofitable Cows—Co-operative Cow Testing," considers carefully the value of cow-testing work and outlines the essentials for the organization of associations.

Extension Circular 44, "The Preservation of Fruits and Vegetables," discusses the value of fresh fruits and vegetables, reasons for the spoiling of foods, and methods of preservation and canning. All of these publications are free to residents of the State, upon request.

Lectures By Men of Country-wide Prominence.—In order that those who attend Farmers' week meetings may have the benefit of the experience of men from institutions and farms outside the State, special attention has been given to this feature.

Prof. J. G. Mosier, who is at the head of the work in soil physics at the University of Illinois; C. G. Williams, practical farmer and investigator, who for the last fifteen years has been associated with the soil fertility work at the Ohio Experiment Station under Director Thorne; D. H. Luce, a successful fruit grower in Erie County; A. G. Phillips head of the poultry work at Purdue University, Lafayette, Indiana; Dr. C. F. Curtiss, Dean and Director of the School of Agriculture and Experiment Station of the Iowa State College and an authority on all subjects relating to livestock; Mr. H. W. Selby, who is connected with a large producing and commission firm in Philadelphia and who has made considerable study of marketing problems, C. J. Cook, a practical vegetable grower of New York State; and George W. Cavanaugh, connected with Cornell University; all of these experts will give lectures on their individual lines of work. It is seldom that the opportunity is provided of hearing so many individuals prominent in the various fields of agriculture.

TWO-YEAR COURSE IN AGRICULTURE POPULAR.

The Two-year Course in Agriculture is attracting a splendid type of student to State College. Students eighteen years of age or over who have had at least a year of farm experience may enter these courses upon satisfying the Dean that they are well enough prepared in secondary school subjects to pursue the work with profit. The course is intended to meet the need of farmers and farmers' boys.

The fact that students completing these courses take responsible positions or assume charge of farms of their own with marked success is proof that the courses fill a distinct need. Over 200 are enrolled in the two-year courses at present.

CONSERVATION OF THE FARM WOODLOT.

The farm woodlot like the home orchard or the small poultry flock is too often considered nothing more than a side issue by the farmer. If it yields enough each year to replenish the wood-pile it has fulfilled its purpose. Little real thought or consideration, however, is given to the conservation of the woodlot with a view to perpetuating its usefulness in insuring a permanent supply of cord-wood.

There is no owner of wooded land who can practice forestry more readily than can the farmer in his woodlot, whether it be large or small. He can do this at no greater cost to himself than a little time. He can also practice forestry while he cuts his trees for winter fuel at the season when other work is not pressing.

Farmers should get away from the notion that a broad knowledge of the art and science of forestry is necessary for the practice of conservation. Common sense and a little judgment will work wonders. Usually no thought is expended on the selection of the trees for fuel. The tree that is near to the road and appears to have straight grain is the one ordinarily selected for cutting. But there are other things that should be considered. If the owner cuts out only the well-formed, straight-grained and quickly-growing trees year after year, in a comparatively short time there will be left only the poor trees. On the other hand, the removal of the inferior trees each year will tend eventually to improve the form and character of the trees that remain.

The trees to be cut for fuel are the rotten or diseased trees, the broken and spiked-top trees, the suppressed and stunted trees, and the very large ones which cover more ground with their crowns than half a dozen vigorous trees would cover. Trees attacked by insects, weed trees or those of no value for use on the farm, but which take up room a better kind of tree should occupy, should be removed.

Sometimes young and vigorously growing trees will stand so closely together that their crowns above ground and the roots below ground will compete with each other to such an extent that growth will almost stop. The removal of one or more trees in a crowded clump will hasten the growth and also encourage a more uniform growth among the trees left standing.

Professor J. A. Ferguson of the Department of Forestry declares that the average farmer's woodlot does not attain an annual growth of more than half a cord per acre, and that by the proper selection of trees for fuel year after year, the removal of only the slowly-growing and defective trees, and the judicious planting of new trees in vacant spaces each year it will be possible to increase the annual production of the woodlot to a cord or more per acre.

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Big Dairy Butter Contest At State College. The largest dairy butter contest ever held at State College was conducted on Pennsylvania Day under the auspices of the Dairy Club of the School of Agriculture. Two classes, i. e., farm and creamery butter, were recognized in the contest and samples were received from almost every county in the State. The sixty-three samples received were much above the average. The highest score was 95, the lowest 82, and twenty-eight samples scored 90 or over. First, second and third prize ribbons were awarded.

Students in Fruit Judging Contest. At the annual judging contest of the Intercollegiate Fruit Judging League, which was held in Baltimore, Md., in November, the team from the Pennsylvania State College won fourth place. The highest score was made by the team from the Ohio State University at Columbus, Ohio, with 95.11 points out of a possible 100. Seven colleges were represented, including Ohio, West Virginia, New Jersey, Pennsylvania, Kentucky, Delaware and Maryland, mentioned in the order of their rank in the contest,

BOYS' AND GIRLS' WORK IN PENNSYLVANIA.

In view of the support which has been given the movement in recent years information lately secured by the Agricultural Extension Department of the Pennsylvania State College, on the progress of club work among the boys and girls of Pennsylvania is of special interest. The statistics are as follows:

Twenty-eight counties have reported a total of 841 corn clubs, 39 potato clubs, 44 garden clubs, 187 livestock clubs and 664 miscellaneous clubs. Definite figures on the number of domestic science clubs are lacking, but it is known that such clubs are well represented. The total number of members in agricultural and domestic science clubs reported in the State is 5,290. Ages of club members range from eight to twenty-one years.

It is with a view to lending aid in the advancement of this movement that the Pennsylvania School of Agriculture has designated an individual to direct this phase of extension work.

BURNT LIME VS. GROUND LIMESTONE.

At present there are no available figures derived from extensive field experiments, covering the relative value of limestone applied to the soil in different degrees of fineness, as compared with equivalent amounts of burnt lime, inquiries upon which point are daily received at the Pennsylvania Agricultural Experiment Station.

Since 1912 pot experiments have been conducted at the Experiment Station with the idea of throwing some light on this question. Two kinds of soil are being used: one a very "acid" soil from the Station fertilizer plats, and the other a depleted or worn-out soil.

The following data, based on clover and oats from the worn-out soil and clover from the acid soil, are of interest at this time. The results are based on the percentage of increased yield over the untreated or check pots, the ground lime having been put through 100, 60, 20 and 8-mesh sieves.

	Burnt Lime	Ground Limestone			
		100 mesh	60 mesh	20 mesh	8 mesh
Worn-out Soil.					
Clover	90.5	87.6	22.5	5.	2.7
Oats	19.8	19.0	18.5	13.1	12.6
Acid Soil.					
Clover	334.6	317 8	101.9	54.4	31.6

The above figures show that finely ground limestone (100-mesh) gives practically the same results as the equivalent of burnt lime, while the very coarse material gave very little increased yield as compared to the 100-mesh stone lime.

In another experiment recently completed it was found that a large excess of lime or limestone is wasteful and that only a slight excess over that necessary to "sweeten" the soil or neutralize acidity should be applied.

For the average acid soil in Pennsylvania one ton of burnt lime or twice that amount of ground limestone per acre is sufficient for an initial application.

On heavy clay soils burnt lime is preferable on account of its more pronounced flocculating character, but under normal conditions the choice between burnt lime and ground limestone depends upon the relative cost in a given locality. The fact that about twice as much ground limestone as burnt lime is necessary, should be kept in mind.

Magnesium limestone has been shown to give the same results as pure limestone.

JANUARY WORK IN THE ORCHARD

January is the off-season for orchard work, but by making use of the slack times the good orchardist keeps ahead of his work. A little observation will disclose a number of things that may be done at this season to improve the condition of the orchard

Some pruning is likely to be needed, especially in bearing orchards. In midwinter, however, pruning is best confined to the removal of dead and broken limbs and the thinning of particularly dense portions. Very heavy pruning at this time is apt to result in more or less sun-scald, especially if the trunks or principal limbs are much exposed.

After the pruning is completed all brush and dead limbs should be removed from the orchard and burned, since such debris provides a good harbor for pests of various sorts, including rabbits, mice, borers, bark-beetles, curculio and tarnished plant bugs. Scraping off the very rough and scaly bark with a dull hoe or similar implement will reduce the number of harbors for apple worms or larvae of the codling moth. Some of these worms will thus be killed directly and the rest will be exposed effectively to attack by their chief natural enemies, the nuthatches and the hairy and downy woodpeckers. A little suet hung in the trees occasionally may attract these natural tree inspectors in the orchards.

The dormant sprays for San Jose scale and similar pests are best applied in the fall soon after the leaves drop and in the spring just before the buds start. In midwinter, however, spraying machinery may be put in good running order or the necessary equipment for making one's own supply of lime-sulphur concentrate may be secured, provided the amount of spraying is sufficient to justify it.

Such an equipment will usually save from 40% to 60% on the cost of lime-sulphur required, and its total cost need not exceed $15; so that any one using seven barrels or more of the ordinary commercial concentrate should be able to save enough in the first year to pay for his entire equipment. The equipment necessary and all details for making concentrated lime-sulphur are given in Bulletin 115 of the Pennsylvania Agricultural Experiment Station.

It is well to locate sources of good lime and sulphur before they are needed. If enough of the lime-sulphur concentrate is made up, sales to neighbors may provide an additional profit.

BUYING GARDEN SEEDS.

In the purchase of garden seeds it is never well to rely upon supplies of local dealers. Experiments conducted by the U. S. Department of Agriculture show that the vitality of such seeds is generally low. Although there may be some exceptions, seed sold in this way, commonly known as commission seeds, are not as satisfactory as those purchased from the numerous reliable seed-houses. Catalogues may be secured from all seedsmen for the asking and a careful study of them will show many varieties which will be of use in the home garden.

C. E. Myers of the Pennsylvania State College makes the following suggestions regarding seed selection.

As a general practice it is well to adhere to standard varieties for the main planting. The novelties which appear from year to year may be tried out in a small way. Sometimes they prove to be very satisfactory, but often they are not superior to other well-known varieties which may be secured at less cost.

After seeds have been received a germination test should be made. This may be done by placing them in moist sand or between moist blotting papers. Such a test will show the vitality of the seeds and will be a useful guide for the rate of sowing later in the open field.

FRUIT TREES FOR SPRING PLANTING.

Consideration of fruit tree varieties for spring planting should not be longer delayed. The leading nurseries are already getting out their lists, and early orders are likely to receive most careful attention. In making out an order special care should be exercised to select varieties suited to the locality, and to secure trees true to name, thoroughly healthy, entirely dormant and free from all evidence of premature digging, faulty storage or improper handling of any kind.

This is best acccomplished by ordering direct from responsible nurseries, after submitting requirements to several firms for bids. It is immaterial where the nursery is located, if the varieties and quality of stock are right, and any nursery can hold trees until the right time for planting. One-year-old trees, which are of good size but not overgrown, are recommended by the Pennsylvania Agricultural Experiment Station.

For home orchards or local markets, a wide range of varieties covering the entire season is desirable. For apples, such a list can be selected from the following varieties as will suit almost any locality, especially in the East. The varieties are named approximately in order of ripening, and include Yellow Transparent, Early Harvest, Red Astrachan, Oldenburg, Primate, Summer Rambo, Jefferis, Maiden Blush, Fall Pippin, Gravenstein, Wealthy, McIntosh, Smokehouse, Hubbardston, Grimes, Jonathan, Delicious, Northern Spy, Rhode Island Greening, Rome Beauty, Stayman Winesap, Stark, Paragon, Roxbury, Yellow Newton and Winesap. Local experience and inquiry will aid in selecting from this list or possibly in substituting others personally preferred or known to be better for the locality.

Good peach varieties would include the Mayflower, Arp Beauty, St. John, Carman, Carnelia, Hiley, Champion, Belle, Ede, Elberta, J. H. Hale, Francis, Crosby, Fox, Smock, Iron Mountain, Stevens, Augburt and Salway.

For pears good varieties would include Wilder, Clapp Favorite, Bartlett, Howell, Seckel, Sheldon, Bosc, Anjou, Anjouleme, Kieffer, Lawrence, and Winter Nelis; for cherries, Richmond, Montmorency, and Morello among the sour varieties and Napoleon, Schmidt, Windsor, and Nelson among the sweets; and for quinces, the Orange is the leader with the Champion usually next in value.

These lists should be modified by local inquiry just as in the case of apples.

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ELEVENTH ANNUAL FARMER'S WEEK

The college held its eleventh annual Farmers' Week, Dec. 27, 1915, to Jan. 1, 1916. The first Farmers' Week was held in 1904. A comparison of certain features of these two meetings, separated by a period of ten years, shows some interesting contrasts.

At the first Farmers' Week held in 1904, there was an attendance of less than 200 from 36 counties. In December, 1915, a thousand farmers from more than 60 counties journeyed to their State institution. The program of 1904 was printed on an ordinary double-sheet folder while for the eleventh annual event a 12-page program and information folder was necessary. Instead of several lectures on different subjects from which the farmer could make a selection of those in which he was most interested there was only one lecture for each hour of the day. One can not help but mark also the increase in the number of the younger generation in attendance in 1915. In the early days of Farmers' Week it was the man who had been farming for a number of years who came to the College for new ideas and new developments in agricultural science which would be of practical value to him in his work. The year 1915 in particular brought to the Week not only men of that type but in striking numbers the younger men, those just starting in to farm; and, what is even more to the point, the boys and girls, the farmers of tomorrow, who, having become interested in agriculture through their activities in corn, tomato, potato and pig club work, are eager to learn more and to become familiar with the possibilities for agricultural education in their State College.

About 75 boys and girls, guests of the College, as a reward for work in club contests, enjoyed the special program arranged for their entertainment and instruction. Corn and potatoes raised by these young farmers were placed on exhibition and entered for prizes. In the corn contest Blair County took first, second and third prizes, as follows; First, Walter E. Hess, of Martinsburg; second, Paul Krider, of Tyrone; third, Malcom Hileman, of Hollidaysburg.

The first prize, given by Hon. Vance McCormick, a trustee of the college, covers expenses for a winter course in agriculture at the college; second, expenses to Farmers' Week at State College given by the

Corn Exchange National Bank, of Philadelphia; third, three books on agricultural subjects, provided by the college. The prize given in the potato contest was awarded to Calvin Caldwell, of Crawford County.

Betterment of the farm and rural community, through the instrumentality of women's clubs, was the keynote of a women's conference, participated in by college and outside authorities and the farmers' wives who came with their husbands to enjoy the special program which had been arranged for their instruction in home economics and the household arts.

In all the eleven years since Farmers' Week became an established recurrence at the Commonwealth's School of Agriculture, never was a keener interest shown than in 1915, nor a more diversified program offered.

Over 160 lectures and demonstartions on agricultural and home economics subjects were delivered, by members of the faculty of the School of Agriculture, specialists from other institutions and persons engaged in practical work.

Farmers' Week has long since passed the experimental stage and the attendance, the interest manifested in the program and the expressions of satisfaction in connection with the entire week of 1915 may be taken as safe prediction of the future value and success of this yearly event.

Dairy Cow Testing Conducted By The College.—During the year closing July 1, 1915, production tests of dairy cows on 149 different farms in the State were conducted by the Dairy Department of The Pennsylvania State College. Yearly tests were run on 46, and seven-day or short-time tests on 103 of these farms.

Six hundred and forty-seven individual Holstein tests were made on 105 different farms; 795 Guernsey tests on 22 farms; 1158 Ayrshire tests on 11 farms and 917 Jersey tests on 11 farms; these figures make a total of 3517 cows tested on 149 different farms. Eighty different men were employed to make these tests during the year.

The foot and mouth disease prohibited tests during a period of about two months.

County Representatives Hold Conference—The County Agricultural Extension Representatives held their annual conference following Farmers' Week, at State College, under the supervision of Mr. E. K. Hibshman.

These annual conferences are arranged for the purpose of talking over plans and projects for the coming year and give opportunity for an exchange of ideas between the men from the different counties. In addition, also, the county representatives come into touch with the latest experimental and investigational work which is being carried on at the Experiment Station and in this way are able more nearly to perform their part as links in the chain connecting the farmer with his College of Agriculture.

Mr. H. J. Wilder, of the Department of Agriculture at Washington, D. C., and Prof. Alva Agee, Director of Agricultural Extension at the New Jersey Experiment Station brought some helpful suggestions gleaned from their experience in the extension work in other sections of the country.

Pennsylvania has 22 county extension representatives in the field, all of whom were present at the conference.

POTASH IN FARM MANURE.

Now that German potash salts are almost out of the market, it becomes necessary for the farmer to look to American sources for his supply of potash fertilizer. Fortunately he does not have to look very far. Ordinary farm manure as it goes to the field contains about 10 pounds of potash per ton. The greater part of this potash is contained in the liquid excrement and is therefore immediately available to plants.

In emphasizing the importance of saving the liquid manure, Dr. C. W. Stoddart, of the Pennsylvania Experiment Station, quotes some interesting figures. It has been estimated that the amount of potash (K_2O) producted annually by 1,000 pounds live weight of horses is 58 pounds in the solid excrement and 45 pounds in the liquid excrement; of cows, 19 and 108 pounds, respectively; of sheep, 38 and 88 pounds; of pigs, 73 and 55 pounds On the average, then, 1,000 pounds live weight of farm animals produce annually in the solid excrement 47 pounds of potash, and in the liquid excrement 76 pounds of potash. These figures show how important it is to save the liquid excrement.

The Ohio Experiment Station estimates that during the six winter months 10,000,000 tons of manure are produced in the stables and barnyards of Ohio. This manure contains 50,000 tons of potash, one-fourth of which is lost by being washed away from open piles and barnyards. Manure exposed to the weather loses half its potash in three months. If the manure is kept under cover this loss is very considerably reduced, and it may be even further reduced if the floor is cemented. Potash is lost by leaching. The way to save the potash, therefore, is to prevent leaching. Since it is impossible to buy potash salts alone, and only to the extent of one percent. in complete fertilizers, some attempt should be made to save the potash produced on the farm.

DAIRY FEEDS.

In feeding dairy cows it should be understood that concentrates are to be used simply to supplement properly the roughage which the farmer raises

It is necessary that the farmer buy the cheapest concentrates for this purpose, by which is meant those that supply the greatest amount of digestive nutrients for the money expended. Farms vary in the amount of roughage raised and in distance from markets, and special localities are characterized by the raising of particular concentrates.

Grain feeds and roughage differ in their composition from one season to another and on different farms; even in different fields. Sometimes also they differ in the same field, their variation depending upon the difference between early and late harvesting. Because of these variations in fields, and the individual peculiarities of the cow, there will always be room for the feeder's judgment. No plan of feeding can be laid down for all localities, and regardless of any rations suggested no rules can take the place of the skill and judgment of the farmer.

In the several grain mixtures given below—the first two and the fourth have been used and proven successful and satisfactory at The Pennsylvania State College—farmers in different localities may find some feeding hints. In any case, however, the question resolves itself into one of locality and individual conditions.

I	Corn-meal	200	pounds
	Cottonseed-meal	150	"
	Dried Distillers' Grains	125	"
	Gluten Feed	100	"
	Wheat bran	100	"
II	Corn-meal	275	"
	Cottonseed-meal	100	"
	Dried Distillers' Grains	200	"
	Gluten feed	100	"
	Linseed-oil meal	50	"
III	Dried Brewers' Grains	200	"
	Corn-and-Cobmeal	225	"
	Cottonseed-meal	100	"
	Linseed-oil meal	100	"
IV	Corn-meal	275	"
	Cottonseed-meal	150	"
	Dried Distillers' Grains	200	"
	Gluten feed	100	"

The practice at the Pennsylvania Experiment Station is to feed each animal one pound of some one of the grain mixtures for each three pounds of milk produced and in addition all the roughage which the cow will clean up.

The farmer may find it necessary to feed more or less grain or to add or substract some of the feeds given above in making his mixtures. He should study his animals in detail so that he will know whether they are doing the best of which they are capable

Detailed directions for computing dairy rations together with the composition of various feeds may be found in Bulletin No. 114 of the Pennsylvania Experiment Station.

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HOME ECONOMICS AND CLUB PROGRAM DURING FARMERS' WEEK POINTS TO A NEW ERA FOR PENNSYLVANIA WOMEN AND GIRLS.

The study of the home and all that pertains to it from a scientific and professional standpoint, although of comparatively recent origin, is acquiring new impetus each year. As our education has broadened we have found that there is a science as well as an art of homekeeping, and the sentiment has gained and is gaining ground that a systematic and practical study of the science and art of homekeeping should be a legimate part of every woman's education.

In the special program arranged for the women in attendance upon Farmers' Week at The Pennsylvania State College, four general divisions of Home Economics were included. The women's share in the week's activities deserves a special word because of the large number present, the keen interest which they manifested and the scope of the activities planned and carried out for them.

Lectures and demonstrations on health, clothing, food and home management, together with a round table conference, made a full week for the one hundred women present. One of the encouraging signs in this connection was the large number of younger women and of girls who had won the trip as prizes in the garden and canning, and corn and livestock club work.

Boys' and Girls' Program.—It is not easy to plan a program embracing entertainment and education for girls of club age, but Miss Pearl MacDonald, in charge of home economics extension at the College, Miss Newcomb, her assistant, and members of the College Staff in home economics; Miss Jessie Field of New York City, Miss Allen, in charge of club work in Mercer County, and Miss Anna MacDonald, of Harrisburg, provided a series of lectures and demonstrations varied, educational and entertaining. Lessons in cutting and making garments, in table service and in bread-making, and a period of organized play, were fitted into the scheme of the girls' program. As the number of girls who come to Farmers' Week increases, this part of the schedule will be diversified and enlarged each year. The girls of today will be the mothers and homekeepers of tomorrow; therefore anything which the college can do to awaken in them an interest in the methods of increasing home happiness through the application of scientific principles to the problems of home life, it owes to them as a State educational institution.

School Lunch.—Mothers who live in the country know how difficult it is to put up lunches of an appetizing, wholesome nature every day, for one or more. The right kind of food for the growing boy and girl does not include a surplus of sweets, pastries and cakes, the tendency many times being to overbalance the school lunch with such foods The fact that the lunch must stand several hours before it is eaten and that it is a cold lunch increases the difficulty. A fireless cooker was suggested as a remedy. With this apparatus at least one hot dish might be prepared and served at noon with little extra work and with the result of better health for the boys and girls.

Organized Play.—If boys and girls are to be well and strong physically a certain amount of their time must be devoted to the playing of games which they will enjoy, that will develop the large muscles of the body and tend to make the individuals strong, sturdy and vigorous. Many city schools are equipped with gymnasiums and playgrounds and organized play is conducted under trained supervisors at systematic intervals. In the country, however, not sufficient thought is given to recreation and play for the children.

Medical Discussions.—While wives and mothers can not be expected to be fully versed in a knowledge of medicine, they should be familiar with a few fundamental facts. Dr. W. E. Forsythe, the College Physician, in his lecture on "Man's Common Diseases and How to Combat Them" enumerated the causes of those diseases; explained how to recognize different diseases; and outlined the precautions to be exercised in caring for patients and the necessity for isolation and disinfection in cases of contagious diseases.

First aid measures were reviewed. In cases of breaks, bruises, burns, cuts and dog and snake bites—all common accidents—coolness and dispatch in emergency measures are necessary. An interesting recommendation called for a more universal use of iodine in the treatment of wounds in place of hydrogen peroxide and other antiseptics so often recommended.

Caution against the use of patent medicines was advised. Dr. Forsythe told his hearers that if they would give heed to this warning they would be in better condition physically and financially.

Clothing.—No home-keeper's program would be complete without a discussion of some of the essentials of clothing selection and textile materials. One of the items of special interest in the clothing lectures at Farmers' Week included the consideration of suitable clothes for children Garments appropriate in fit and weave for different seasons, simple in line and workmanship, easy to launder and permitting perfect freedom of movement, were recommended. Children's garments illustrating these points were exhibited.

A practical demonstration, showing how to alter and use a bought pattern, was given in connection with a talk on "The Adaptation of the Commercial Pattern."

Examples of house dresses easy to launder, made of good material, and requiring a minimum of time in the making, were exhibited, and women were urged to adopt two or three styles of house dresses which could be used repeatedly, as one step in the standardization of women's garments. Further lectures on textiles and clothing values, embodied practical suggestions as to the judging and selection of materials. The common household tests for the different fibers, such as wool, cotton, linen and silk, were given.

House Furnishings.—Houses may be over-furnished, too scantily furnished and furnishings may also lack taste and utility. By taking these points into consideration, the lectures on household furnishings sought to bring out the principles that should govern the selection, and arrangement of furnishings and the discarding of useless furniture. Suggestions for proper house management included labor saving devices which are practicable and valuable in house-work.

Food.—The value of fresh fruits and vegetables as a part of the diet has been generally recognized, but education is still necessary to impress the housewife with the value of fruits and vegetables of good quality. "Cooking apples," a term suggesting an inferior grade is often used by the housewife in ordering apples for sauce, and other purposes. Demonstrations have already proved that poor fruit results in a commensurately poor quality of cooked material, and that the increased price paid for good fruit will be compensated in better flavor, less waste, and the lesser amount of time and energy used in cooking.

Interest in canning as a means of absorbing some of the surplus products of the home garden and orchard is almost universal. The new "cold-pack" method of canning, which is simple and can be used with practically no expense for equipment or materials, was demonstrated.

One of the daily tasks of the homekeeper is the planning of three meals. Because of the high cost of meat many women must substitute cheaper protein foods; hence a period was profitably spent in discussing meat substitutes and their preparation.

Wholesome desserts came in for their share of consideration. Simple puddings, custards, gelatine and frozen desserts were advised in preference to rich puddings, pies and pastry.

Principles governing the making of quick breads; the leavening agents and their uses, and the various methods of mixing, were clearly outlined and demonstrated.

In the special talks on Food Values, the various foods were analyzed as to their total nutritive value, and their cost per given unit of food value; and the principles governing the making of menus were touched upon.

Round Table Conference.—With the idea in mind of bringing together women interested in a discussion of the problems which must be met by housewives in the country and of the possibilities of club work among the country women as a means to improving living conditions, an informal round-table conference was held.

The training of boys and girls in school through club work, the books they should have, the community interests, and how to get the women and their families to unite in working for the good of all—all these are country problems.

Miss Jessie Field advocated the teaching of household arts in the country school, although this must ordinarily be limited in accordance with the training of the teacher. The support of parents in such work must be secured before much can be accomplished.

If a sewing machine is available girls can learn many things about sewing. A modest cooking equipment will be a great help in cooking.

If money cannot be secured for equipment, compositions on methods of doing the simple home duties and on sanitation and hygiene will serve the purpose; and school exhibits and community days also will teach many a lesson.

Miss Myrtle Allen, who had charge of Girls' Club Work in Mercer County last summer, gave some excellent suggestions as to how women could help in forwarding such work.

One of the most difficult questions a mother faces today is that of directing the reading of her children. Miss Anna MacDonald, of the Free Library Commission, Harrisburg, classified books into recreational and educational reading. She warned against books that do not inspire, uplift and make one better for the reading. Inasmuch as children love books of imagination, fairy tales, mythology, these should be selected for them Miss MacDonald indicated ways and means for securing books from traveling libraries, if a community did not have its own library.

Mrs. J. E. Shellenberger, a farmer's wife who is president of a Rural Women's Club in Blair County, indicated in a clear manner the possibilities for betterment of conditions in home, school and community through the united efforts of women banded together as a Rural Women's Club.

This conference, with all its helpful discussions, and the various lectures and demonstrations of the week, points to a new epoch in work among the women of the state; and the club conference or round-up has probably established itself as an annual affair.

STATE COLLEGE PUBLISHES NEW BULLETIN ON CABBAGE.

A new bulletin, No. 137, "Experiments With Cabbage," prepared by Professor C. E. Myers, of the department of horticulture, has just been issued by The Pennsylvania State College. This bulletin covers experiments on cabbage to determine such points as the relative value of early and late sowing of seed, of large and small plants at first transplanting and of different planting distances. Special attention has been given also to experiments with late cabbage.

Some phases of these experiments have been conducted through a period of six years. Interesting conclusions concerning environmental, seasonal and other factors in their influence on the experiment are carefully summed up.

Every vegetable grower should have a copy of this bulletin, which is free upon request to residents of Pennsylvania.

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New Appointment.—G. H. Grabe, a graduate of The Pennsylvania State College, in the class of 1915, has been appointed assistant in animal husbandry to succeed R. W. Duck, who has accepted a position with the department of animal husbandry at Syracuse University.

Winter Short Courses close A Successful Term.—The winter short courses in Agriculture and Home Economics at The Pennsylvania State College closed February 25, after a most successful term.

One hundred and thirty-one students, including seventeen women, were enrolled in these courses. The term is divided into two semesters, and for the women who attend a six-week course in home economics is arranged. This year several women students remained after the close of the work in home economics to continue work in various agricultural subjects.

A feature of this work is the interest manifested and the good attitude shown by those taking the courses. Expressions of satisfaction concerning the arrangement of the work and the way in which it is presented are common.

The personnel of the students deserves special mention. While many were from farms, others also came from commercial positions to take work along some specific line. Among both men and women college graduates were represented and several of the women students represented different lines of organization work in certain sections of the State.

Of particular significance was the fact that with the exception of students in one or two lines of dairy work few desired positions after completing their courses, most of them returning to the home farms.

Out of eighty-one students who pursued courses in various lines of dairying seven were recommended for managers of various types of dairy manufacturing plants at good salaries and six as helpers in such plants. Several men also were recommended as cow testers and one or two found employment at the college dairy plant.

Five or six states and a large number of counties in Pennsylvania were represented by the enrollment in these courses.

Students Conduct Better Seed Campaign.—Through the co-operation of R. Bruce Dunlap, Blair County Extension Representative, and The Pennsylvania State College, a whirlwind better-seed campaign lasting three days was conducted February 23, 24 and 25 in Blair County.

Ten students, all seniors in the agronomy course undertook the work. Each was assigned a certain number of schools in which to speak and demonstrate. On the average each man conducted 4 meetings during the day and one at night. At the day meetings, talks and demonstrations to school children were provided. The night meetings were open to all.

The necessity for testing seed corn was explained and the method demonstrated, and the treatment of seed oats for smut and seed potatoes for scab was carefully outlined. After each meeting orders were received for formalin to treat seed oats and potatoes. At the proper time the formalin will be distributed with detailed directions for treatment of oats and potatoes.

Here are the results of the campaign: one hundred and thirty-two day and evening meetings were held, 4,725 persons were reached, and orders for 300 pints of formalin were received. One pint of formalin is sufficient to treat 40 bu. of oats; enough was sold in the county to treat 12,000 bu. of seed, which is sufficient to plant 6,000 acres.

As a part of the campaign, blanks for boys' and girls' club work, together with a uniform list of vegetable varieties suitable for Blair County conditions, were distributed.

TREATING SEED POTATOES FOR SCAB.

Two methods of treating seed potatoes for scab approved by the Pennsylvania School of Agriculture and Experiment Station are the formalin and the corrosive sublimate (bichloride of mercury) treatments. In so far as their effectiveness against scab is concerned there is little difference between these two treatments.

When formalin is used one pint of 40% formalin is mixed with 30 gallons of water. This solution may be placed in a barrel, tank or any convenient vessel. The most convenient plan is to place the potatoes in a gunny sack and allow them to soak for two hours, when they should be removed, spread out on the barn floor and allowed to dry. The potatoes may be planted as soon as dry.

The second method of treatment calls for the use of 4 ounces of corrosive sublimate to 30 gallons of water. The corrosive sublimate should be dissolved in warm water, and sufficient water added to make up the thirty gallons. It is necessary to use non-metallic vessels for this solution, owing to the corroding properties of mercury bichloride. Potatoes should be soaked for 1½ hours and then spread out to dry. Corrosive sublimate is very poisonous and extreme care must be exercised to protect animals or persons from potatoes thus treated.

Treated potatoes should not be returned to infected sacks. Sacks which have been soaked are safest for this purpose.

It is useless to treat potatoes and plant them in fields where scab has appeared in seasons just preceding the time of planting, as the scab organism lives in the soil for a considerable period of time. Lime and excessive manure also favor scab development.

SPRAY CALENDAR FOR PENNSYLVANIA FRUIT GROWERS.

The following spray calendar for fruit growers in Pennsylvania has been prepared by the Department of Experimental Pomology at The Pennsylvania State College.

APPLES, PEARS, AND QUINCES.

1. **Dormant Spray.**—Preferably just before buds start. Lime-sulphur solution diluted to a specific gravity of 1.03. For scale, blister-mite, and fungous diseases. Add nicotine as in "2," if aphids or red-bugs are hatching.

2. **Scab and Aphis Spray.**—When blossoms show pink, before opening. Lime-sulphur solution, 1.01, for scab or cedar rust. Add lead arsenate paste, 3 ℔. to 50 gal., for canker-worms, bud-moth, and other leaf-eaters. Add 40% nicotine extract, ½ to ¾ pint to 50 gal., for oat, rosy, and green aphis, mites, red-bugs, or pear psylla. (These two sprays may also aid against blossom blight, by checking aphids and ants, and killing bacterial masses).

3. **1st. Codling Spray.**—To be completed within 10 days after petals fall. Lime-sulphur solution, 1.008, for scab, rust, blotch, etc.; and lead arsenate paste 2 or 3 ℔ to 50 gal., for codling moth or apple worm, curculio, canker-worms, etc. Add nicotine as in "2," for green aphis clover mite or red-bugs, if present. (Use plenty of material and fill calyces with poison).

4. **2nd Codling Spray.**—About 2 weeks after "3," although best applied when moths actually begin emerging, as determined by cage observations in the orchard. Materials same and pest largely the same as in "3." Also useful against apple maggot, leaf-hoppers, etc., where they occur.

5. **Second-Brood Spray.**—About July 25 to August 1. Materials as in "3." For second brood of codling moth, leaf-eating caterpillars, late scab infections, blotch, green aphis, etc. (Not often needed, if earlier applications have been thorough).

(Where pests are known to be absent, corresponding spray may be omitted).

PEACHES AND PLUMS.

1. **Dormant Spray.**—In spring, before buds start. Lime-sulphur solution, 1.03, for San Jose scale and leaf-curl. For lecanium scale, substitute miscible oil, diluted 1 to 15.

2. **Curculio Spray.**—When the shucks or calyces begin shedding. Lead arsenate paste, 3 ℔. to 50 gal., and 2 ℔. lime slaked. Add 40% nicotine extract, ½ to ¾ pint to 50 gal., if aphis is bad. On plums, add self-boiled lime-sulphur (8-8-50) for leaf-spot.

3. **1st Rot Spray.**—3 or 4 weeks after "2." Self-boiled lime-sulphur (8-8-50), and lead arsenate paste, 2 or 3 ℔. to 50 gal. For brown rot, scab, and curculio. Repeat nicotine if needed for aphis.

4. **2nd Rot Spray.**—About 4 weeks after "3." Lime-Sulphur solution alone, at 1.003; or self-boiled lime-sulphur (8-8-50), if variety is especially subject to spray injury. For brown rot and scab.

(All mummied fruit should be removed before growth starts).

CHERRIES.

1. Dormant Spray.—In spring, before buds start. Lime-sulphur solution, at 1.03, for scale and fungous diseases. (Not often needed on sour varieties).

2. Aphis and Curculio Spray.—Immediately after petals fall. Lime-sulphur solution, at 1.008, and 40% nicotine extract, ½ to ¾ pint to 50 gal. for aphis and leaf-spot. Add lead arsenate paste, 3 ℔., for curculio, slugs, and red leaf-beetle.

3. Brown Rot Spray.—When fruit is size of a small pea. Materials and pests same as in "2," and especially for brown rot and fruit fly. (Latter is worst on late sour varieties. If very bad, use a coarse spray of lead arsenate, 3 ℔., and molasses, 1 pint to 50 gal., on lower limbs, when adults appear, in early June).

4. Leaf-spot Spray.—Shortly after fruit is picked. Lime-sulphur alone, 1.008, to prevent defoliation by the leaf-spot or shot-hole fungus, or to control mildew. Repeat a month later, if this disease is bad.

(If pests are known to be absent, corresponding spray may be omitted).

DILUTION OF LIME SULPHUR.

In applying any concentrated lime-sulphur spray, home-made or commercial, it is essential that a definite method of dilution be followed. Two solutions may look exactly alike and yet differ widely in density; hence any accurate method of dilution must be based primarily on the density of the particular concentrate at hand.

Accurate dilution is very simple and easily accomplished with the aid of a hydrometer having a specific gravity scale. The method of dilution advised by the Pennsylvania School of Agriculture and Experiment Station is as follows:

Determine the density of the concentrate with a specific gravity hydrometer, preferably with one having a graduated scale at least 5 inches in length. Divide the decimal of this density by the decimal of the spray desired. The quotient is the total rate of dilution.

Examples: (In each case upper numbers indicate readings of concentrates and lower numbers show densities of sprays).

For Scale: $\frac{(1)\ .24}{(1)\ .03} = 8.$ $\frac{(1)\ .30}{(1)\ .03} = 10.$

For Apple and Cherry in Leaf: $\frac{(1)\ .25}{(1)\ .01} = 25$ $\frac{(1)\ .24}{(1)\ .008} = 30$

Last Spray on Peach and Plum: $\frac{(1)\ .24}{(1)\ .003} = 80$ $\frac{(1)\ .30}{(1)\ 003} = 100$

All dilutions are obtained by taking one part of the concentrate and adding enough water to make the total dilution indicated.

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COLLEGE WILL CONDUCT BUTTER-SCORING CONTEST.

An educational farm-butter scoring contest is to be conducted during the spring, summer and fall by the Dairy Husbandry Department of The Pennsylvania State College, State College, Pa., for the benefit of the farm butter-makers throughout Pennsylvania.

This contest will follow the same general lines as former contests conducted by the Dairy Husbandry Department. Much interest has been shown in the past in this work by the farm butter-makers of the State; and because of this interest and also because more butter is made on Pennsylvania farms than on the farms of any other state every effort will be made to make this contest as practical and far-reaching as possible.

The purpose of the contest is to show the common defects in farm butter and to explain how to control them. A reliable score as a means of advertising means much to every butter-maker in the selling of his butter. A uniform butter means satisfied customers and better prices.

The contest will be conducted along the following lines: (1) Every maker of farm butter in the State is eligible and is urged to send in samples. (2) Samples of one pound each are desired. They are to be well cooled, wrapped in several thicknesses of paper and packed in a small, light wooden or tin box similar to a common chalk box. (3) Samples should be sent by Parcel Post to the Dairy Husbandry Department, State College, Pa. They should be sent early enough so that they will arrive in State College before the day of the contest. (4) The Contests will be held on the following dates: May 1, June 1, July 1, Aug. 1, Sept. 1 and Sept. 30; and a second contest will be conducted during the winter months if desired. (5) The butter will be scored and tested for moisture, and a complete report will be sent to every contestant each month. (6) A complete report of each churning from which samples are taken is desired. This report is to be made out on blanks furnished by the Department. These blanks will be sent out each month with the report of the previous score. They are to be filled out and sent in with the sample. (7) The butter will be sold, less the small amount used for sampling and the proceeds will be returned to each contestant each month. (8) First, Second and Third Prize Ribbons for the highest average score for the State will be awarded at the end of the contest. First, Second and Third Prize Ribbons for the best county averages, and a Ribbon of Merit to all who average a score of 90 or above will also be given. (9) All further details and information may be secured by addressing the Dairy Husbandry Department, State College, Pa.

Creamery butter contests will also be conducted at the College. Detailed information concerning creamery contests may be secured by writing the Dairy Husbandry Department.

Summer Session Course in Agriculture.—A course in agriculture will be offered in the Summer Session for Teachers which is to be held from June 26 to August 2, 1916, at The Pennsylvania State College. For beginners there will be a course in elementary or high school agriculture and in farm soils, breeds of livestock, poultry, farm dairying, vegetable gardening, botany and forestry.

Prof. Lindley M. Dennis, Supervisor of Agriculture of the State Department of Public Instruction will offer a course in rural school problems. The departments of geology, botany and zoology will cooperate in a course in nature study.

Special attention will be directed toward the problem of the one-room public school and township high school. A series of five lectures, one each week, on the present agricultural outlook, is scheduled. These will be presented by department heads of the School of Agriculture.

Students who take the summer courses in agriculture are given credit for this work in case they desire at a later date to enter the two-year or four-year courses.

CONTROLLING PEACH TREE BORERS.

These insects are among the worst pests in the peach orchard. Their presence is indicated by masses of gum intermingled with woody castings near the surface of the ground, and a more or less unhealthy appearance of the foliage in general.

When borers are found they should be dug out and destroyed with the aid of a strong, sharp knife and pliable wire. The trees should be examined for borers twice a year, preferably in October and May. After the latter examination a protective covering should be applied to obstruct so far as possible the entrance of new borers. Observations at The Pennsylvania State College School of Agriculture and Experiment Station show that lime-sulphur solution is as safe and effective a material as any. It should be applied either with a coarse spray nozzle or with a brush, and the trunk of the tree should be thoroughly covered from the exposed crown to a height of 15 inches or more.

Lime-sulphur at various densities up to 1.33 has been used by the Pennsylvania Experiment Station without any injury to the trees, and the denser materials make a better coating. A little lime-sulphur sediment or some extra lime may be added. Eight or ten pounds of either material is enough for 50 gallons of solution. Arsenicals are not recommended for this purpose as some of them have proved injurious to trees and useless against the borer.

When there is no danger of severe freezing, it is a good practice to leave the base of the tree exposed for a few days after the initial "worming." This results in drying the bark over the tunnels and thus aids in detecting borers that have been over-looked. Soil should be replaced before freezing occurs as the tree base is especially susceptible to winter injury. A slight mounding of the soil about the tree will also be a protection against mice.

The first application of the coating should be made before the first eggs are laid by the adult moths, about the middle of June. Two additional applications, one early in July and the other about the middle of August, should complete the borer control to the end of the egg-laying season, which is about middle September.

The resulting reduction in the amount of cutting required and the improved condition and longer life of the trees will generally more than compensate for the extra work involved in applying the protective covering.

CONTROL OF CANKER WORMS.

Canker worms are the "loopers" or "measuring worms" which appear in great numbers on apple trees soon after the buds open. These worms often defoliate the trees.

Canker worms are held in check (1) by mechanical barriers such as tree tanglefoot or its equivalent; (2) by lead arsenate sprays; (3) by thorough cultivation of the soil during early summer.

Where a mechanical barrier is desired a narrow strip of cotton batting should first be placed around the tree and this strip covered with a band of heavy building paper or similar material about 5 or 6 inches wide, to which the sticky preparation is applied. Five pounds of resin and three pounds of castor oil, to which some printer's ink or other heavy oil has been added to prevent dryness, is recommended by the Pennsylvania Agricultural Experiment Station. The sticky band should be renewed often enough to keep it effective over the periods when pests are active. Bands should be in place throughout March and April and in some cases even in February and from the middle of October until the ground freezes.

Spraying immediately after the "worms" appear, with lead arsenate at the rate of 3 or 4 pounds of the paste or half as much of the powder in 50 gallons of spray, is usually sufficient. A second application within a week or ten days may occasionally be necessary. By adding lime-sulphur at the summer rate, scab, apple worm and various other pests may be controlled at the same time.

If the soil is cultivated thoroughly during June and early July the pupa form of the cankerworm will be destroyed. This is hardly necessary when spraying has been thoroughly done.

COLLEGE OUTLINES PREVENTIVE FOR WHITE SCOURS IN CALVES.

White scours is a germ disease, hence its suppression lies in the prevention of infection. The Pennsylvania State College School of Agriculture and Experiment Station outlines the following suggestions for the prevention of this disease.

The cow should be permitted to drop her calf upon a clean bed of straw in a thoroughly disinfected stall. Immediately after birth of the calf, the umbilical cord should be soaked in a 2% solution of some standard dip. A wide-mouthed vessel will be the most convenient container for the solution as it may be held close to the body and the cord folded down into the solution.

To prevent contamination the cord should not be touched with the fingers. After soaking both the cord and an area 3 inches in diameter surrounding, it should be painted with iodine, by means of a small piece of absorbent cotton. A drying powder of equal parts boric acid, powdered alum and flowers of sulphur should then be dusted on the cord twice daily until it has dried off. The powder should be applied with a dusting can.

Additional precautions include the rinsing of the cow's udder with a dip solution, to destroy germs on these parts before the calf is suckled and the thorough cleaning of the stable, including disinfection of the walls and floors.

If the calf is very valuable dairy-men are advised by the Pennsylvania Experiment Station to inject a serum prepared from a number of organisms found in calves with white scours, as a preventive. This should be done as soon as the calf is dropped.

FUEL ECONOMY POSSIBLE WITH FARM GAS ENGINE.

With the price of gasoline soaring almost from day to day, the farmer who possesses a gas engine must naturally be interested in any method of economizing on fuel bills.

Prof. E. N. Bates of State College, in a lecture on "The Farmer and the Gas Engine," given during Farmers' Week at State College, placed emphasis on the possibility of fuel economy through the use of a combination of kerosene and gasoline. Farmers were directed to mix these fuels lightly at first, beginning with a small amount of kerosene, and if the engine would stand it, to work up to a mixture of possibly half and half. Prof. Bates expressed it as his opinion that a saving of possibly 25 to 30% might be effected by a judicious use of this combination fuel.

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CATTLE FEEDERS CONVENE AT STATE COLLEGE.

The second annual convention of the Cattle Feeders of Pennsylvania was held at The Pennsylvania State College, Wednesday, April 12, 1916, at which time steers used in the winter's experimental feeding work were under observation and discussion.

Four-year and Two-year Students Take Dairy Inspection Trip.—During the week preceding the Easter vacation at The Pennsylvania State College 12 seniors in the four-year course in dairy husbandry were conducted on a trip which included some of the most important dairy farms, condenseries, ice cream factories and market milk plants in the East. During the same week twenty two-year students followed a less extensive but none the less comprehensive itinerary.

A New Bulletin.—"Raising Beef Cattle," is the title of a new bulletin (No. 138) just issued by The Pennsylvania State College Agricultural Experiment Station. This bulletin, which was prepared by Prof. B. O. Severson of the department of animal husbandry, deals with experiments made with the idea of determining (1) the possibilities of raising beef cattle in Pennsylvania, (2) whether the demand for "feeders" could be met profitably, (3) the cost of maintaining breeding stock, (4) the cost of raising, growing and breeding beef cattle, (5) the cost of finishing beef cattle for market, (6) the value of silage as a sole roughage, and of cottonseed meal as a supplementary feed, (7) details of management in feeding and breeding of beef cattle for profitable production.

This bulletin will be mailed free upon request to any one in the state.

LATEST STEER FEEDING EXPERIMENT SHOWS INTERESTING RESULTS.

The steer feeding experiments conducted at The Pennsylvania State College, School of Agriculture and Experiment Station during the past winter were intended as a comparison of the efficiency and economy of different feeds in fattening steers. The animals were divided into five lots of 12 steers each. The feeding period covered 140 days.

Lot 1, was fed the ration commonly used by Pennsylvania steer feeders, composed of ear corn or corn and cob meal, three parts; bran, one part; corn stover and mixed hay, during the entire experiment.

Lot 2, was fed corn silage and cottonseed meal for the first 56 days of the experiment, ear corn being added during the last 84 days of the experiment. The cottonseed meal was fed at the rate of 2½ pounds per 1,000 pounds live weight. Corn silage was fed in such amounts as the steers would eat and the ear corn at the rate of 15 pounds per 1,000 pounds live weight.

Lot 3, was fed similarly to Lot 2, except that alfalfa hay was substituted for cottonseed meal. The alfalfa was fed at the rate of 5 pounds per 1,000 pounds live weight.

Lot 4, was limited to 20 pounds of corn silage per day. Mixed hay in such amounts as the steers would consume, and cottonseed meal at the rate of 2½ pounds per 1,000 pounds live weight were also fed. During the last eighty-four days ear corn was added at the same rate as to other lots.

Lot 6, was given all the corn silage the animals would consume together with cottonseed meal, throughout the experiment. The cottonseed meal was fed during the last eighty-four days at the rate of 2½ pounds per 1,000 pounds live weight, and then increased to 3½ pounds per 1,000 pounds live weight. Especial interest is attached to the feeding of Lot 6, inasmuch as the ration used has not been tried before in the North, so far as known. The accompanying table indicates the results of the experiments.

	Lot I	Lot II	Lot III	Lot IV	Lot VI
Initial Weight per steer...	877.8 lbs.	908 lbs.	913.3 lbs.	983.7 lbs.	899.7 lbs.
Value per cwt. in lot ...$	7.50	7.50	7.25	7.25	7.35
Cost per steer ....$	65.83	68.10	66.23	64.79	66.13

	Lot I	Lot II	Lot III	Lot IV	Lot VI
*Feeds consumed daily per steer (1st period—56 days)					
Ear corn	9.0				
Corn Silage		66.0	58.0	20.0	66.0
Bran	3.0				
Cottonseed meal		2.5		2.4	2.4
Corn stover	4.0				
Alfalfa hay			5.0		
Mixed hay				14.0	
Daily gain—average (1st period)	1.74	2.62	2.00	1.70	2.48
Cost per 100 pounds gain.$	9.75	5.60	6.64	8.80	5.90
Feed consumed per steer (last 84 days)					
Ear corn		17.0	16.5	16.4	
Corn and cob meal	12.0				
Cottonseed meal		2.8		2.7	3.5
Bran	4.0				
Silage		25.0	21.0	20.0	66.0
Mixed hay	10.0			6.0	
Alfalfa hay			6.4		
Corn stover	4.0				
Average daily gain (2nd period)	1.86	1.68	1.85	1.98	1.79
Cost per 100 pounds gain $	13.10	14.23	12.03	12.90	9.85
Average weight at close of experiment	1132	1196	1181.6	1155	1189.5
Gain for entire period	254	286	268	261	290
Average daily gain entire period	1.81	2.05	1.91	1.86	2.07
Total cost of feed $	30.04	28.31	26.20	29.17	23.07
Total cost of steer $	95.87	96.41	92.43	93.96	89.20
Cost cwt. gain $	11.81	9.83	9.77	11.18	7.99
Final cost per cwt. $	8.47	8.06	7.83	8.14	7.49
Margin necessary in lot not including pork $	.97	.56	.58	.89	.14
Value per cwt. on basis Pittsburgh market. (allow 45 cents for shipping expenses). $	9.00	9.30	8.90	9.15	9.25
Pork produced (pounds)	147	358	402	345	313
Cost of feed to hogs per lot $	25.25	18.64	18.64	18.64	29.44

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*Prices of feeds: Silage, $3.50 per ton; stover, $3.00 per ton; mixed hay, $13.00 per ton; alfalfa, $15.00 per ton; cottonseed meal $34.00 per ton; ear corn, 65 cents per bushel; shelled corn, 70 cents per bushel; corn and cob meal, $20.00 per ton.

Some points should be especially noted. The gains during the first 56 days show that silage and cottonseed meal produces a much larger daily gain than ear corn, bran, mixed hay and stover. The average daily gain in the lots receiving corn silage was in the same proportion as the amount of silage consumed. Lot 1, which received no silage, was much more expensive than any of the lots receiving silage and Lot 4, with a limited amount of silage was more expensive than the lots receiving all they would consume.

During the last eighty-four days corn and cob meal was substituted for ear corn in Lot 1, and ear corn was added to Lots 2, 3 and 4. The average daily gain by lots during the last 84 days was exactly opposite in order as compared to the first period. This shows that during a long period the tendency of the feeds is to even up so far as daily gains are concerned. The cost of gains during the last period was much greater in all lots than during the first period, showing that the longer the feeding period is continued the greater is the expense of producing gains.

The total gain for the 140 days was greatest in Lot 6, which received no grain. This is a very strong point in favor of silage. The cost of producing 100 pounds gain was almost $2.00 cheaper in Lot 6 than in any other lot, and almost $4.00 per 100 pounds cheaper than Lot 1, fed the common Pennsylvania ration.

This experiment shows strongly the value of corn silage as a feed for fattening steers. Silage cheapens the cost of producing gains and insures greater profit from feeding. Lot 6, shows a profit of $15.57 per steer. This profit is greater than that of any other lot, by far. Lot 2 was second as to profit, Lot 3 third, and Lot 4 fourth, with Lot 1, a poor fifth.

Hogs were allowed to follow the steers in each feeding lot. Less pork was produced in Lots 1 and 6 than in the other lots, Lot 1 being much below Lot 6. This is due to the fact that ground corn was fed in Lot 1 most of the time, while ear corn was fed to Lots 2, 3 and 4. In all lots it was necessary to feed grain to the hogs during the first period. Corn was fed at the rate of 1 pound per 100 pounds live weight of hog, and tankage 1 pound to 8 pounds of corn.

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BUTTER CONTESTS TEACH MANY LESSONS.

In the educational creamery and farm butter-scoring contests which have been held at State College since the first of May an encouraging interest has been manifested.

In the first farm butter-scoring contest fifty samples were received. The highest score was 93 per cent. The lowest 85 per cent. Samples in this contest were criticised for carrying stale cream flavors, due, in most cases to holding the cream too long before churning. A number of samples contained salt undissolved. This trouble may be overcome by using less salt and regulating the working of the butter. The average moisture content of the samples, which was about 11%, could have been raised without detriment. The average salt content was about 3%.

For the first creamery butter contest fifty-seven creameries and for the second fifty-eight creameries sent samples. In the first contest the decision of the judges was that a great deal of the lower-scoring butter was due to the fact that creameries were receiving too much old, stale cream. In a number of cases flavor was spoiled by too high a percentage of salt. It was recommended that all cream should be free from taint and should not test under 35% in butterfat.

The second creamery butter-scoring contest showed considerable improvement in the samples submitted. While a few samples showed overworking and a few were gritty from salt and wavy in color, the average was good. The average, however, was reduced, due to the presence of samples with a strong garlic flavor. About 30% of samples met with this objection.

This flavor may be overcome to some extent by keeping the cows out of garlic-infected pasture until the grass is in good condition.

MOLASSES PROVES GOOD APPETIZER FOR STEERS.

In connection with the steer feeding projects conducted by The Pennsylvania State College School of Agriculture and Experiment Station during the past winter a special feeding experiment with two lots of six steers each is worthy of note.

These steers were the largest and fleshiest animals in the group when the feeding experiments were begun last fall. They were fed on concentrates for the 140 days of the experiment to secure data on the cost of gains when silage is limited and when concentrates are fed during the entire period; also to determine whether molasses could be used as a partial substitute for corn. The following table shows the comparative results when corn and molasses were fed

	Lot I	Lot II
Initial weight per steer	983.8 lbs.	981.3 lbs.
Final weight per steer	1315	1286
Gain per steer	332	305
Average daily gain	2.3	2.1
Initial value per cwt. in lots	$ 7.65	$ 7.75
Initial cost per steer	75.26	76.05
Cost of feed per steer	39.26	35.28
Total cost of steer	114.52	111.33
Cost per cwt. gain	11.82	11.56
Final cost per 100 pounds	8.70	8.66
Margin necessary without pork	1.05	.91
Daily feed consumed[*]		
Corn silage	20.0 lbs.	20.0 lbs.
Cottonseed meal	2.8	2.8
Mixed hay	6.0	6.0
Ear corn (1st 98 days)	8.5	13.5
Shelled corn (last 42 days)	7.5	12.5
Molasses	5.0	
Value per cwt. on basis of Pittsburgh market (allowing 45 cents for shipping expenses)	$ 9.60	$ 9.70
Pork produced 820 pounds @ 9.5 cents	$77.90	
Cost of feed for swine	26.94	
Profit from pork produced	$50.96	

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[*] Price of feeds: Silage, $3.50 per ton; mixed hay, $13.00 per ton; ear corn, 65 cents per bushel; shelled corn, 70 cents per bushel; molasses, $31.20 per ton.

It will be seen by referring to the table that Lot 1, the molasses-fed lot, made a little greater average daily gain, but the cost was greater than in the case of Lot 2. The steers fed molasses evidenced keener appetites than those which did not receive molasses. At present prices however, molasses does not appear to be an economical substitute for corn.

SOILING CROPS FOR DAIRY FARMS.

Soiling crops for moderate to good-sized dairies located near large centers of population and on high-priced land are both practical and economical, according to authorities at The Pennsylvania State College School of Agriculture and Experiment Station. The crops best suited for this purpose are rye and winter vetch seeded in the fall, which give the earliest available green feed; oats and Canada peas seeded early in the spring for somewhat later feed; sorghum and cow peas seeded the last half of May for late soiling purposes; and corn, both sweet and field, for very late summer feed. Soybeans may also be used, and can be grown alone or with corn. These crops may be supplemented advantageously with alfalfa and clover. The former may generally be cut three times during the season, and the latter twice each season. By adjusting the acreage and the time of planting a succession of green crops may be provided from early spring to late fall.

In arranging for soiling crops it should be kept in mind that from 50 to 70 pounds of green matter per cow daily will be required, the amount depending on whether the soiling crop is to supply all or only a part of the roughage. Knowing the length of period when each crop will be available and the probable yield per acre, one may calculate how large an acreage may be required of the several crops to provide for a dairy or a given number of cows.

A soiling system involves more labor and expense than where the chief dependence is upon pasture, but greatly economizes in the use of land and is justifiable where land values are high and the dairy produce commands a high price.

SUMMER SOILING CROP

A plan showing a sequence of green crops which may be planted to help out the pastures, or as a partial substitute for hay and grain. (Basis ten cows, allowing 40 to 50 pounds of green crops per day for each cow.)

Kind	Seed Per Acre	Approximate Time of Seeding	Area	Approximate Time of Cutting
Rye and Vetch	(R. 1 bu.) (V. ¾ bu.)	Sept. 15	⅓ A	May 15-25
Wheat	(2 bu.)	Sept. 15	⅓ A	May 26-June 5
Alfalfa or	(25 lbs.)	Aug. 1-15	½ A	June 6-15
Wheat	(2 lbs.)	Sept. 15	⅓ A	June 6-15
Red Clover	(12 lbs.)	April 1-15	⅓ A	June 16-25
Oats and Canada Peas	(O. 1½ bu.) (P. 1½ bu.)	April 1-15	⅓ A	June 26-July 5
Oats and Canada Peas	(O. 1½ bu.) (P. 1½ bu.)	April 15-30	⅓ A	July 6-15
Alfalfa or	(A. 25 bu.)	Aug. 1-15	½ A	July 16-25
Barnyard Millet	(M. ½ bu.)	May 15	½ A	July 16-25
Soybeans	(1 bu.)	May 20-30	⅓ A	July 25-Aug. 5

Kind	Seed Per Acre	Approximate Time of Seeding	Area	Approximate Time of Cutting
Soybeans	(1 bu.)	June 1-10	⅓ A	Aug. 6-15
Sorghum and Cowpeas	(S. ½ bu.) (C. P. ¾ bu.)	May 20-31	⅓ A	Aug. 16-25
Alfalfa, 3rd cutting, or	(A. 25 lbs.)	Aug. 1-15	1½ A	Aug. 25-Sept. 5
Sorghum and Cowpeas	(S. ½ bu.) (C. P. ¾ bu.)	June 1-15	⅓ A	Aug. 25-Sept. 5
Flint, early dent, or sweet corn	(8 quarts)	May 10-20	⅓ A	Sept. 6-21
Dent corn	(8 quarts)	May 15-25	⅓ A	Sept. 22-Oct. 5

One may not need to plant all these crops, but some may prove helpful. The dates of seeding and cutting are suggested for Central Pennsylvania usage In other sections they may be modified as dictated by judgment and experience.

STERILIZATION OF GREENHOUSE SOIL

Greenhouse soil is sterilized to eradicate soil pests, diseases and weed seeds. Sterilization with steam and formalin are the two general methods used.

Steam sterilization includes the pipe or pan methods. For the small operator the pipe method, by which heat is forced into iron pipes laid in the bottom of the bed and the soil thoroughly cooked, is not as practicable as the pan method. With the pipe method, building paper, canvas or burlap is laid over the bed to confine the heat.

The pan method as used in the greenhouses at the School of Agriculture and Experiment Station of The Pennsylvania State College consists in forcing steam into an inverted galvanized iron pan laid over the soil in the bed. This method may be used to good advantage with a small area and when only a small boiler is at hand.

A temperature of from 180° to 210°F. is required to cook soil thoroughly and the pan should remain in one spot not less than an hour. The soil should be worked and loosened before the pan is placed over it.

Sterilization should be thorough, otherwise it is practically useless. Even an almost imperceptible residue of disease left in the soil may spread over the entire bed under favorable conditions.

Drenching the soil as well as the sides of the greenhouse, and the paths and the sides of the beds with formalin—2 to 3 pounds to 50 gallons of water—the application in the bed being made at the rate of a gallon to a square foot of soil, is advocated by The Pennsylvania Station, to insure greater immunity to disease.

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Group of Excursionists Hears Explanations of Fertilizer Plots.

FARMERS' EXCURSIONS MORE POPULAR THAN EVER.

Farmers' excursions to State College during the month of June were established several years ago by the co-operation of the railroads and the college authorities. This year eleven of these excursions took place; about thirty-five counties were reached directly and about six thousand farmers had opportunity to observe the work of their School of Agriculture and Experiment Station. Special trains and low rates are arranged for these excursions, and the visitors are guided through the college buildings and more particularly over the college farms where detailed explanations are given by men familiar with the work. The educational and social advantages of such a trip are not to be measured by its nominal cost.

STATE COLLEGE STUDENTS WIN HORSE JUDGING CONTEST.

A judging team composed of five seniors from the course in animal husbandry at The Pennsylvania State College scored a victory in a horse judging contest at the annual horse show held at Devon the latter part of May.

The team, which was composed of John F. Dodge, R. H. Olmstead. W. L. Homer, P. S. Korb, and A. T. Kearney, won first honors in competition with other teams from the Veterinary School of the University of Pennsylvania, the Williamson Farm School and the Delaware Agricultural College.

The Pennsylvania State College team won three firsts, three seconds and one third in five classes of horses. John F. Dodge made the highest individual showing in the contest.

COLLEGE ISSUES BULLETIN ON POTATO DISEASES.

The Pennsylvania State College School of Agriculture and Experiment Station has just issued its bulletin No. 140 on Potato Diseases.

This bulletin which has been prepared by Prof. C. R. Orton of the department of botany includes a discussion of the origin and spread of potato diseases and control methods; seed selection and disinfection; spraying; and a description of the various diseases as to form, method and point of injury and time of occurrence.

The bulletin is mailed free upon request to residents of Pennsylvania.

AGRICULTURAL FAIR EXHIBIT.

Following a practice established four years ago, The School of Agriculture and Experiment Station at The Pennsylvania State College will this year send an exhibit to a number of the county fairs in the State. This exhibit is an attempt to show, as far as possible, the nature and scope of the experimental, investigational and instructional work which the school and station is conducting. It includes the work in horticulture, botany, agronomy, dairy husbandry, animal husbandry and domestic science.

The exhibit will be sent this year to the following fairs: Byberry, Philadelphia County; Stroudsburg, Monroe County; Nazareth, Northampton County; Tunkhannock, Wyoming County; Lancaster, Lancaster County; York, York County; Hughesville, Lycoming County; Conneaut Lake, Crawford County; Clarion, Clarion County; Dawson, Fayette County; Erie, Erie County; Stoneboro, Mercer County; Bedford, Bedford County.

COLLEGE INVESTIGATIONS SHOW BEST SHEEP FEEDS.

Sheep feeding experiments, with special reference to the maintenance of breeding ewes, have been conducted by The Pennsylvania State College for four and a half years. These experiments have shown that silage as a sole roughage is a dangerous feed for pregnant ewes and that alfalfa as a sole roughage is too expensive. A combination of corn silage and alfalfa hay proves very efficient in the vigor of lambs produced and the cost of production.

In the experiment in question a grain mixture, consisting of 5 parts shelled corn, 3 parts oats, 3 parts wheat bran and 1 part oil meal, was fed to breeding animals during the winter with good results.

It is not necessary to feed grain to breeding animals on good pasture.

MANAGEMENT OF POULTRY BREEDING STOCK.

Improper management of breeding stock is sometimes largely responsible for the poor results of hatching eggs either under hens or in the incubator. It is poor policy to wait for the hatching season before giving attention to the poultry breeding stock. The best way to take care of this trouble is to prevent it by attention to the breeding stock in the fall. Failure of eggs to hatch, or the hatching of sickly, weak chicks, does not necessarily mean that the hens producing the eggs are poor. Without the right care and management even the best stock may deteriorate.

An attempt should be made each year to increase the efficiency of the flock. This may be done in two ways: (1) By proper breeding; (2) by proper incubation.

Infertile eggs and weak chicks may be due (1) to poor care of breeding stock; (2) breeding stock being immature or too old; (3) too many females to one male; (4) hens being too fat; (5) low vitality of breeding stock; (6) lack of green feed; (7) lack of protein feed; (8) insufficient exercise.

As any one of the above reasons, together with other factors, might cause poor hatches, the necessity of taking care of each condition separately is evident.

The selection of breeding birds is most important. Ordinarily the farmer breeds from the general flock. The best practice, however, is to select the best individuals at the start and breed only from these.

Females should show feminine characteristics, be good layers, good examples of the particular breed, and should be mature. The male birds should be vigorous, show good quality and bone, have a good lusty crow and, like the females, also should be good examples or types of their breed.

The number of females to a male depends upon the strength of the male. As a rule, however, good fertility is obtained in light weight breeds by using one vigorous male to 12 to 15 females. For medium weight breeds, one male should be provided for each 8 to 12 females. In some cases the number of females may be increased, but it is better to have fewer hens than to decrease fertility by too many.

The Pennsylvania Agricultural Experiment Station has found that it is unwise to attempt to breed from pullets. As a rule the fertility of the eggs thus secured is low, chicks are weak and a few years' continuance of this practice will lower the vigor of the general flock. Females two or three years old make the best breeders. The male may be either a well-developed cockerel, thoroughly matured, or a good, vigorous cock bird.

It is not best to keep breeding stock in a small yard or cooped in a house. Free range to allow plenty of exercise makes a happier, more contented and healthier bird. Exercise is absolutely essential for the poultry flock. Where free range is out of the question as much yard space as possible should be provided.

For general purposes the feed ordinarily fed to laying hens will give good results with breeding stock. There should always be plenty of protein or nitrogenous feed in such a ration. No stimulating feeds should be given, as they force egg production and this results in poor fertility. Such feeds lack the proper nourishment for the developing chicks also.

Green feed, which strengthens the hatching power of eggs, may be given in the form of cabbage, mangel wurzels, sprouted oats or similar substances. The ration fed to laying hens at The Pennsylvania State College is:

Grain Feed		**Dry Mash**	
Cracked Corn	60 lbs.	Corn Meal	200 lbs.
Wheat	60 "	Bran	100 "
Oats	30 "	Wheat middlings	100 "
		Good quality beef scrap	100 "

The hens during the laying season should be watched carefully to see that they do not deposit layers of fat on their bodies. Fat results from the feeding of too much carbohydrate or starchy food. If such a condition is observed the carbohydrate and starch content of the food should be reduced. Keeping the hens busy is another means of preventing them from becoming overfat.

To prevent poor hatches from eggs from mediocre breeding stock, the farmer should begin at the right point, i. e., at the selection and care of his breeding stock. The remedy in this case lies in prevention.

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ALFALFA HAY FOR BROOD SOWS.

The use of some leguminous hay as a portion of the ration for wintering brood sows is highly desirable. Such a feed supplies protein, gives bulk to the ration and materially decreases the cost of feeding during the winter period.

Brood Sows Munching Alfalfa from Feeding Rack.

During the past two winters an experiment has been in progress at The Pennsylvania State College to determine the value of alfalfa hay for feeding brood sows and the relative cost of various rations.

In this test one lot was fed alfalfa hay alone, while a second lot received a combination of shelled corn and alfalfa hay.

The sows receiving alfalfa hay alone were allowed all the hay they would consume, and the average quantity consumed per day was 4.6 lbs. Toward the end of the experiment, these sows became so low in condition that it was considered advisable to feed a small quantity of corn in order to get them in better condition for farrowing. The litters from the sows in this lot were normal in size and the pigs were strong and vigorous. The use of this one feed alone could not be recommended, because of the very thin condition which it produced in the sows. When this ration was used the cost of feeding was $6.14 per head for a period of 114 days.

In a second lot a combination of shelled corn and alfalfa hay was used. Corn was fed at the rate of one lb. per 100 lb. live weight, and alfalfa according to the appetites of the animals. The sows in this lot made a desirable gain during the feeding period and were in the proper condition at farrowing time. They consumed an average of 3.6 lbs. corn and 1.8 lbs. alfalfa hay per day. The corn, of course, increased the cost of the ration, and it cost $6.70 per head to feed this combination ration for a period of 114 days.

In the case of both lots the alfalfa was fed from open racks.

POT EXPERIMENTS DEMONSTRATE VALUE OF GREEN MANURES.

Pot experiments, recently completed by Prof. J. W. White, of The Pennsylvania State College School of Agriculture and Experiment Station, have an important bearing upon the value of green manures in conserving soil fertility.

Numerous field experiments with various green manures have been conducted within recent years, as a result of which a long list of beneficial effects have been established. Comparatively little work of an experimental nature, however, has been done to study the action of green manures in different stages of decay, with reference to the change of lime requirement and formation of humus.

The materials used were incorporated with a homogeneous soil of known lime requirement and tested at regular intervals for a total period of nine months. The manures were applied in two series: (1) in the original green state, and (2) after being dried. A comparison was then made between the relative decay of crops plowed under in the growing state, and those cut in the field and later plowed under after partially drying.

The experiment sought to determine not only the comparative values of different green manures and barnyard manure as producers of humus, but also their action as regards increasing or decreasing soil acidity and their value in increasing available nitrogen in the soil.

The soil used had a lime requirement equivalent to 4,644 pounds calcium carbonate per acre, and was taken from the ammonium sulphate fertilizer plots on the College Farm. A soil of this nature was used to make it possible to determine if necessary both an increase and decrease in acidity or lime requirement, as the case might be.

The manures applied green included soybeans, wheat, rape, Canada peas, oats, sorrel, sweet clover, corn, red-top, rye, timothy, alfalfa, red clover and hairy vetch. These were classed as Series I. Series II included red clover, sweet clover, rye, soybeans, alfalfa, rape, hairy vetch, sorrel, red-top and corn, all of which were applied after being air dried.

The conclusions drawn from these experiments are, in general, as follows:

(1) The fifteen manure treatments increased the lime requirement of the soil as an average of only 466 pounds. (2) Sorrel, red clover, red-top, rye, vetch, alfalfa, barnyard manure and timothy caused a decrease in lime requirement at the end of nine months. (3) Wheat, corn, sweet clover, rape, oats, Canada peas, and soybeans increased the lime requirement in the order given. (4) When a mature green crop is incorporated with the soil it shows less tendency to increase the lime requirement than green manure applied at an early stage of growth. (5) Green manures partially dried before being plowed under, showed a greater tendency to increase the lime requirement than when incorporated while still green. (6) The non-legumes showed a greater tendency to increase the lime requirement than did the legumes. (7) Green manures applied green increased the available nitrogen to a greater extent than when applied air dried. (8) When the manures were incorporated green, 63.78 per cent. of the total organic matter underwent decomposition, as compared to 59.55 per cent. when they were applied air dried. (12) Sixty-one per cent. of the increased residual organic matter was present as available humus where alfalfa was applied, 31 per cent. where red clover was applied, and 23 per cent. where barnyard manure was applied. (13) In the case of the leguminous green manures, 12.16 per cent. of the total organic matter applied was present in available humus as contrasted with 9.53 per cent. where non-legumes were used. (14) Red clover increased the available nitrogen, the total organic matter and available humus, and decreased the acidity of the soil to a greater degree than any manure treatment.

On the basis of the results shown, the conclusion is drawn that green crop residues, when decomposed in the soil, show little tendency to increase materially the lime requirement of the soil.

SPECIAL LEADER FOR TWO-YEAR AND WINTER SHORT COURSES.

The growth in the number of students taking the two-year and winter short courses in agriculture at The Pennsylvania State College has been such as to warrant the appointment of a special instructor to assist with these students. W. W. Wood, a graduate of the Class of 1916 at State College, has been chosen to head this work. While Mr. Wood's work will include the general supervision and guidance of the students in the two courses mentioned, it will have in mind also the larger purpose of linking up the graduates from these courses with various lines of agricultural extension in their several communities, including the work of county extension representatives and teachers of agriculture in the high schools of the State.

WINTER COURSE CATALOGUE NOW AVAILABLE.

A catalogue bulletin describing the subjects to be taught in the winter short courses in agriculture and home economics at The Pennsylvania State College, has recently been distributed. This bulletin is free upon request to those desiring a copy.

Seven different departments of work are open to winter short course students. These include agronomy, animal husbandry, dairy husbandry, horticulture, forestry, and home economics. In addition, the Department of Dairy Husbandry offers its usual course in dairy manufacture. The term is divided into two parts of six weeks each, The short courses for the coming winter at State College will open December 6, 1916, and close February 28, 1917. It will pay anyone interested to send for the short course bulletin. Address, Director Agricultural Extension, State College, Pa.

FIVE NEW BULLETINS FROM STATE COLLEGE

Since June 1, 1916, five new bulletins and circulars have been distributed by The Pennsylvania State College School of Agriculture and Experiment Station. These bulletins are available to residents of the State upon request, and are as follows:

Extension Circulars.

Number 45—Potato Culture, Prof. C. F. Noll.
" 46—Alfalfa, Prof. F. D. Gardner.
" 47—Farm Poultry, F. D. Crooks.
" 48—Children's Clothing, M. Jane Newcomb.

Bulletins.

Number 141—Cultural Methods in Bearing Orchards, Dr. J. P. Stewart.

BULLETIN MAILING LIST TO BE REVISED.

The School of Agriculture and Experiment Station at State College has found it necessary to revise its mailing list. To that end cards have been sent to those on the present mailing list. Blank spaces are provided on these cards so that the one sending them in may indicate the subjects in which he is interested. Those who have not already replied to these notices will have another opportunity during the present month. Cards sent for this purpose should be returned **AT ONCE. DO IT NOW.**

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Yield of clover on one-fourth acre plat at State College, where nothing was added to the soil.

LIME AS A LIMITING FACTOR.

College Demonstration Enlightening.

A demonstration carried out on one of the farms of The Pennsylvania State College during the last three years shows that lime may be applied to the average soil with profit.

This demonstration was begun in 1912. The soil in the field selected was typical of the limestone valley soils in Pennsylvania. The treatments given and the rotations followed were designed as a demonstration rather than an experiment, and were made a part of the regular farm operations, and not a part of the experimental work.

Owing to the poor condition of the soil and the fact that crops did not grow well, it seemed desirable, in order to build up the field rapidly, to get it into clover as quickly as possible. For this reason clover was sown in oats in the spring of 1912. The plats used were each one-fourth of an acre in area. The initial fertilizer treatment is indicated in the accompanying table. In addition to this treatment, the clover on all plats was treated with 300 pounds acid phosphate per acre prior to seeding to wheat in 1914. The commercial fertilizer, applied when oats was sown in 1912, consisted of 350 pounds acid phosphate, 100 pounds potash and 50 pounds nitrate of soda.

Yield of clover on one-fourth acre plat at State College. Lime alone turned the trick.

The table shows the yields of the different crops to date, figured on an acre basis. No record was kept of the yield of oats during the first season.

Yields Per Acre.

Plat	Treatment and rate per acre	Yield in Clover Hay 1913-1914	Yield of Wheat 1915	Yield of Clover Hay 1916
1.	Nothing	1040 lbs.	16.6 bu.	3100 lbs.
2.	Ground Limestone—1800 lbs.	1960 lbs.	20.6 bu.	4000 lbs.
3.	Ground Limestone—1800 lbs. Commercial Fertilizer—160 lbs.	2776 lbs.	20.6 bu.	4720 lbs.
4.	Nothing	920 lbs.	15.3 bu.	2560 lbs.
5.	Ground Limestone—1800 lbs. Fertilizer—250 lbs.	2256 lbs.	20.0 bu.	4120 lbs.
6.	Commercial Fertilizer—250 lbs.	1460 lbs.	18.2 bu.	4280 lbs.
7.	Nothing	1360 lbs.	16.6 bu.	3260 lbs.

A comparison of some of these figures is interesting. In the case of wheat, for instance, the yields from lime, and lime and fertilizer, are the same for plats 2 and 3; and in the case of plat 6, the yield from fertilizer alone was considerably lower than where lime and fertilizer was applied, on plat 5. For both years listed there was considerable difference in the yield of clover hay, due to seasonal differences. In practically every instance the yields from plats receiving fertilizer and lime were considerably larger than those from either lime or fertilizer alone.

There is every reason to believe that the increase in nitrogen resulting from the clover in the rotation exerted a favorable influence on the wheat yield. This theory is borne out by the fact that the yields of wheat where lime alone and lime and fertilizer were applied were the same. The increased clover yield in turn was the result of the limestone application.

The ground limestone cost $1.75 per ton and 75 cents for applying, or a total of $2.50 an acre. On this basis the lime application cost $2.25 an acre. The fertilizer applied cost one cent per pound.

Figuring hay at $12 per ton and wheat at $1 per bushel, the following returns per acre are secured from the various plats.

Comparative Profits.

Plat	Hay 1913-14	Wheat 1915	Hay 1916	Total	Increase over average of nothing plat*	Cost of application	Increase over cost of application
1.	$ 6.24	$16.60	$18.60	$41.44			
2.	11.76	20.60	24.00	56.36	$15.72	$2.25	$13.47
3.	16.65	20.60	28.32	65 57	24.93	3.85	21.08
4.	5.52	15.30	15.36	36.18			
5.	13.54	20.00	24.72	58.26	17.62	4.75	12.87
6.	8.76	18.20	25.68	52.64	12.00	2.50	9.50
7.	8.16	16.60	19.56	44.32			

* $40.64

Lime alone gave excellent yields and profits proportionally. The general conclusion to be drawn from the demonstration is that there is a limiting factor in the productivity of any soil. In the case of the soil mentioned, lime was the limiting factor. Considerable money is lost by applying commercial fertilizer alone to an acid soil, and the demonstration indicates that a maximum profit is secured when lime is first used to correct acidity, and this treatment is supplemented with commercial fertilizer. Lime and fertilizer together proved a paying combination.

WINTER SHORT COURSES BEGIN DECEMBER SIXTH.

Practical in every detail and as inexpensive as it is possible to make them, the winter short courses in agriculture and home economics at The Pennsylvania State College are attracting an enthusiastic class of students each year. The courses for the coming winter will cover a period of twelve weeks from December 6, 1916, to February 28, 1917.

Tell us in what branch of agriculture you are most interested, and we will show you where you can benefit by one or more of these short courses. If you are a farm housewife, we have provided for you in our home economics course. This is designed to present approved methods of work and to familiarize the student with the simple, scientific principles that underlie the problems of food, clothing, shelter and household management.

Living expenses and college fees for the twelve weeks need not exceed $85, and may be slightly less. A prospectus covering the work of the winter courses in detail may be secured by addressing the Director of Agricultural Extension, State College, Pa.

FARMERS' WEEK AGAIN.

The Pennsylvania State College School of Agriculture and Experiment Station calls attention to its annual Farmers' Week, which will be held from December 27, 1916, to January 3, 1917. Advance notice of this meeting is given in order that farmers may begin now to plan for it.

Last year over a thousand attended the Farmers' Week sessions—a pretty good evidence of their popularity and value. Regardless of whether you are a general farmer, an orchardist, a market gardener, a dairyman or a livestock grower, you will find something on the program to interest you. Special features will be arranged for the farm women and the club boys and girls who attend.

Watch this Bulletin and your local papers for further announcements. Keep in mind the dates—Decemebr 27, 1916, to January 3, 1917.

NEW APPOINTMENTS.

The following appointments have recently been made to the faculty of The Pennsylvania State College School of Agriculture and Experiment Station:

Irl D. Wilson, D. V. M., instructor in animal husbandry, the appointment to take effect September 1, 1916. After pursuing studies in general agriculture at the Iowa State College for two years, Dr. Wilson graduated from the four-year course in veterinary science, since which time he has been engaged in veterinary practice in Minnesota.

G. A. Meckstroth, as assistant in botany, substituting for Professor C. R. Orton, begining September 1, 1916, and terminating June 30, 1917. Mr. Meckstroth is a graduate of Ohio State University, 1914, from which institution he received the degree of master of science in 1915.

Doctor H. H. Havner, transferred from the department of animal husbandry to the department of agricultural extension.

L. P. McCann, Junction City, Ohio, assistant in animal husbandry. Mr. McCann is a graduate of the Ohio State University, class of 1915, and during the past year served as assistant in the department of animal husbandry at that institution.

Mr. A. L. Beam, who held the teaching fellowship in the school of agriculture last year, has been appointed instructor in dairy husbandry, beginning August 4, 1916. Mr. Beam is a graduate of the State College of Washington, and received his master's degree from the Pennsylvania State College this year.

Professor Fred Rasmussen, as professor of dairy husbandry, vice professor C. W. Larson, resigned. Professor Rasmussen graduated from the University of Iowa in 1905. The following year he served as assistant in the dairy husbandry department at Purdue University and the next year as assistant professor of dairy husbandry at the University of Iowa. From Iowa he went to the New Hampshire State College as professor of dairy husbandry.

G. M. Shisler, Penn State 1916, as assistant in agricultural chemistry, beginning September 1, 1916.